# CURTISS

## FLYING BOATS : AERONAUTICAL MOTORS
## AEROPLANES : HYDROAEROPLANES

THE CURTISS AEROPLANE CO. HAS ALWAYS BEEN THE DOMINATING CENTER OF AVIATION IN AMERICA. ITS CAPACITY HAS STEADILY GROWN UNTIL TO-DAY IT IS THE LARGEST AND BEST EQUIPPED AEROPLANE MANUFACTURING CORPORATION IN THE WORLD, AMPLY EQUIPPED WITH ALL FACILITIES FOR BUILDING A LARGE VARIETY OF TYPES OF AEROPLANES, HYDROAEROPLANES, FLYING BOATS AND AERONAUTICAL MOTORS IN *LARGE QUANTITIES* AND FOR *PROMPT DELIVERY*

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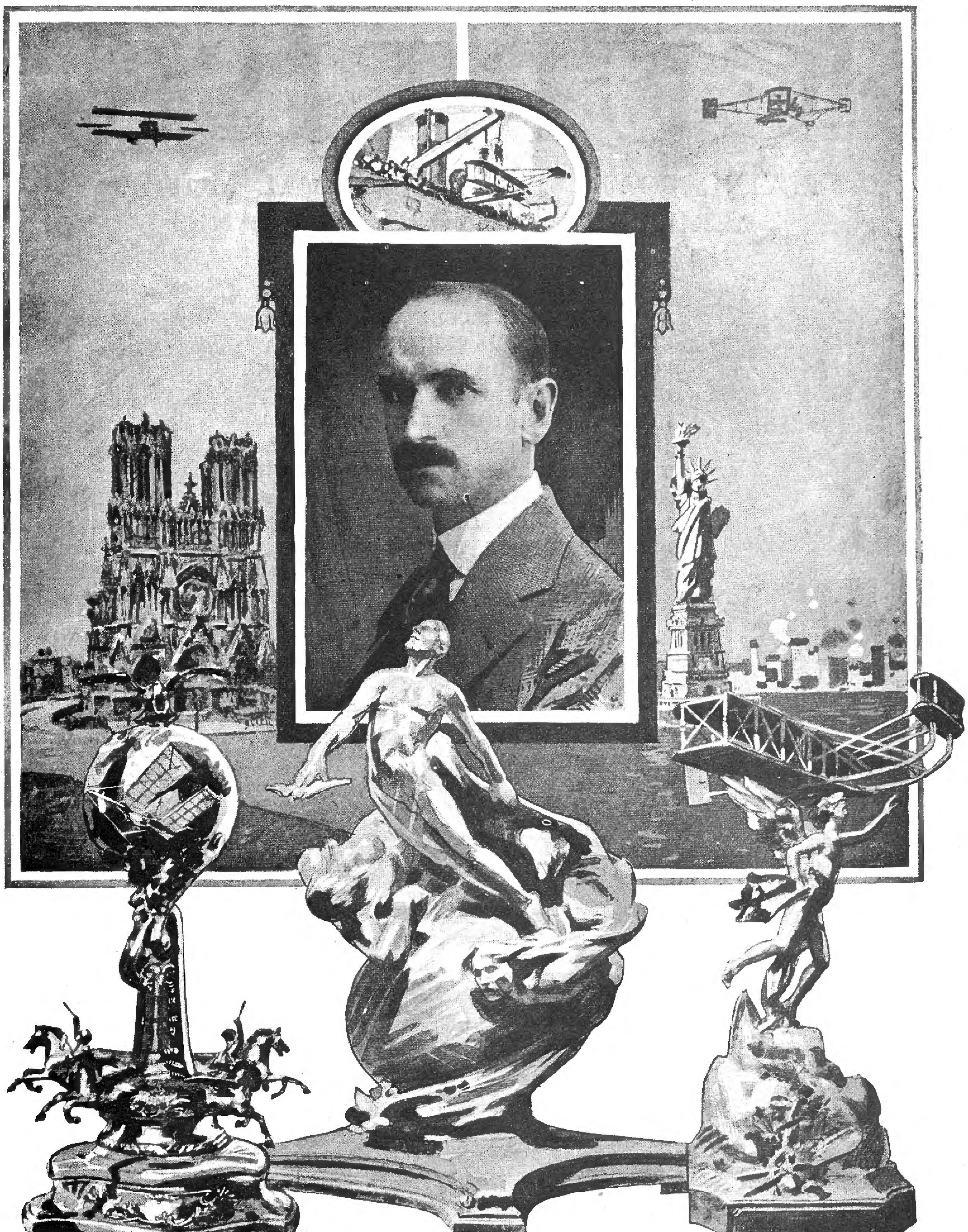
## THE CURTISS AEROPLANE CO.

BUFFALO, U. S. A.

CABLE ADDRESS: "CURTISAERO" WESTERN UNION CODE

IN ADDITION TO THE MAIN PLANT AND EXECUTIVE OFFICES IN BUFFALO, N. Y., THERE ARE FOUR OTHER BRANCH FACTORIES—THREE IN BUFFALO, N. Y., AND ONE IN HAMMONDSPORT, N. Y., AS WELL AS TRAINING SCHOOLS, HANGARS AND FLYING FIELDS AT BUFFALO, HAMMONDSPORT, N. Y., NEWPORT NEWS, VA., MIAMI, FLA., AND SAN DIEGO, CAL.



GLENN H. CURTISS
**Pioneer aviator; founder and present head of the Curtiss companies; some of his early achievements and the trophies he has won**

# INTRODUCTION

ALL *improvements are accepted slowly and with protest by man. New inventions always meet with opposition, advanced ideas with adverse comment. Nevertheless, nothing worth while ever fails to triumph, finally, when its worth is actually proved and recognized by the world.*

*It is said that the first baby carriage brought with it a storm of protest and scorn. Some even went so far as to predict the death of its occupant and the ultimate destruction of the home as a result of its adoption and use.*

*It is a fact, too, that laws were passed limiting the speed of the first railway trains to eight miles an hour.*

*The automobile was believed by some to be only a mechanical aid to suicide. Yet how quickly have all these natural but strangely perverse prejudices against new ways of transportation been dissolved by the ever brightening light of knowledge and progress.*

*Only three years ago a man made his will, bid his family a tearful farewell, and went aloft with a feeling akin to that supposed to exist in the heart of a soldier going into battle,—but to-day, three years later, how different.*

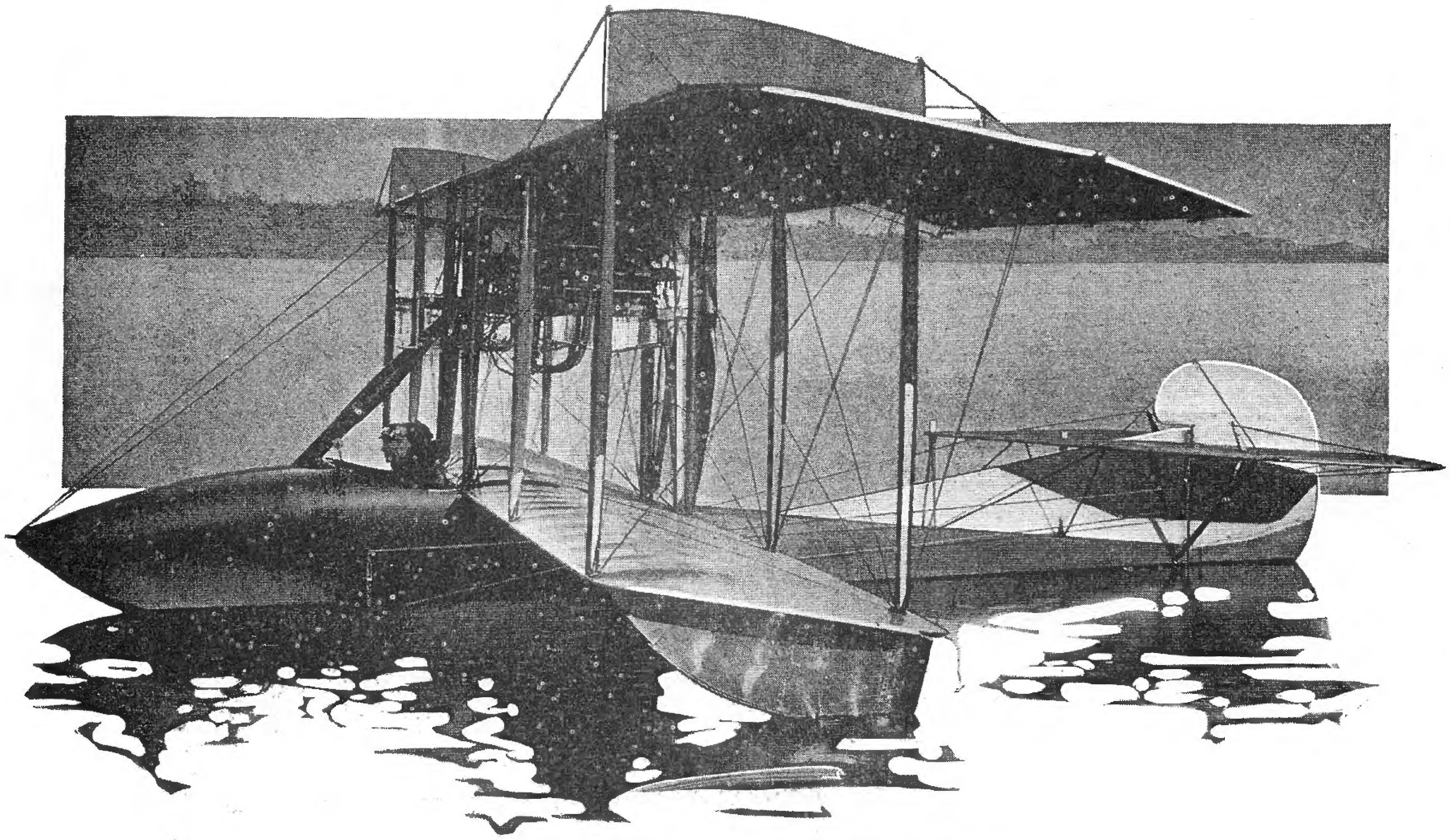
*Flying in the air with a heavier-than-air machine is now a fact, an every-day sight, indeed, an every-day business with some already.*

*Prejudices and fears, once strong, are rapidly giving place to confidence and pride as the art demonstrates its utility, social and economic worth.*

*Hundreds of people ascend with no thought of danger: old men, women and even children.*

*True, there are accidents, occasionally, but seldom are these due to flying alone. Stunts in the air, as on the ground, often result in fatalities; but even these are less frequent than those occurring with other forms of transportation, as can easily be shown by reference to comparative records. Flying is not a hazardous occupation, rather is it a safe one. A few daring pioneers have conquered the air. It is now yours to possess and enjoy.*


PHOTO, COURTESY "OUR NAVY MAGAZINE"

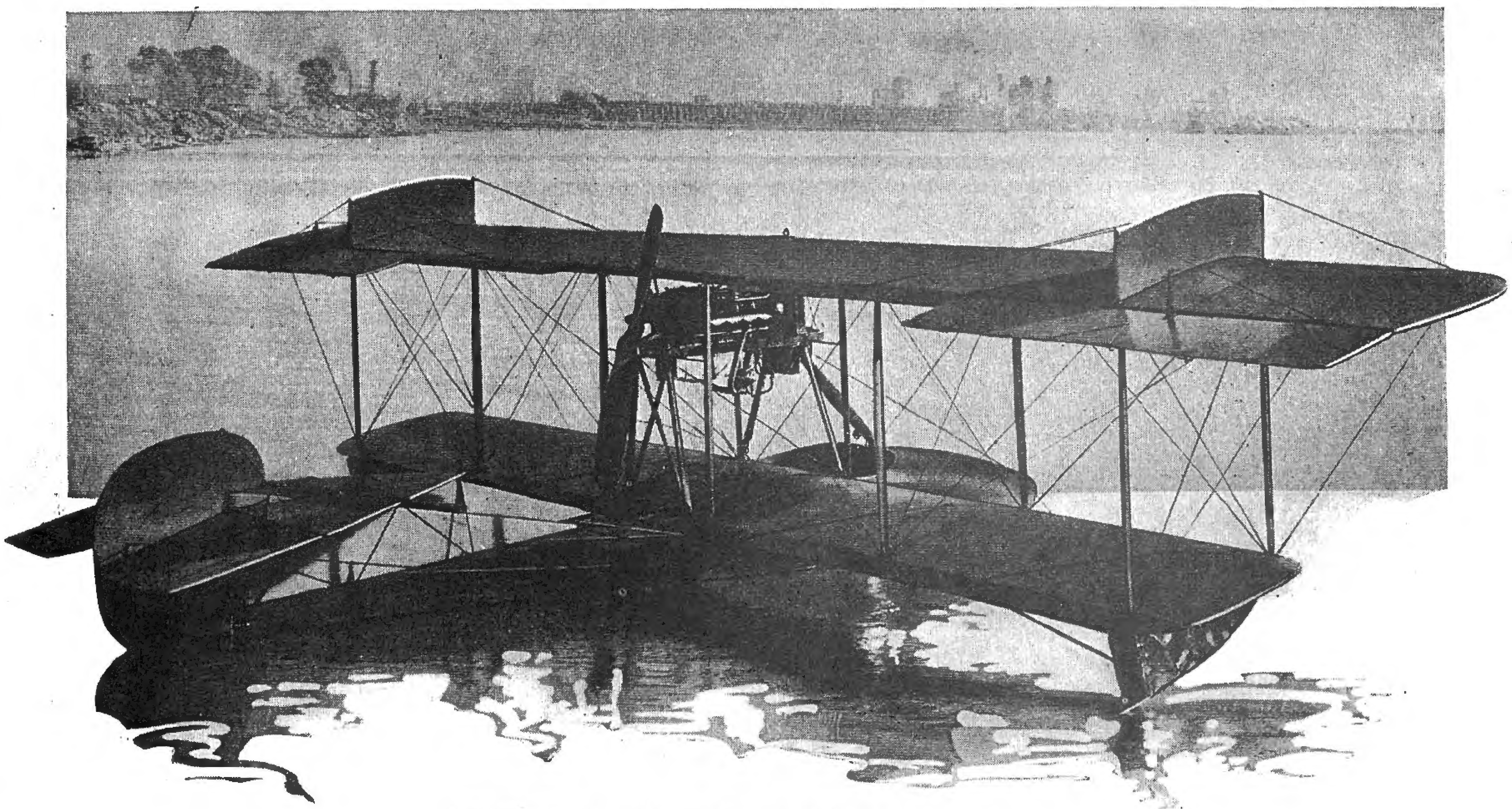


CURTISS MODEL F FLYING BOAT

TO those whose enthusiasm for outdoor sports has, successively, led them through motoring, motor boating, hydro-planing and ballooning, the Curtiss Flying Boat offers the next logical step to new sensations,—new worlds to conquer.

It furnishes a new dimension, a new exhilaration, a wonderful fascination, which cannot fail to thrill and please the most blasé. In the quiet twilight of a summer day what is more sport than, as the last rays of the setting sun begin to turn the upper sky to gold, to jump into a "Flying-Boat" and soar aloft—there to experience that enviable and pleasing sight of seeing the sun set several times in succession. Flying offers sensations new and without number; a new scenery, a new outlook, a new perspective, an enlarged field of vision, which grows suddenly greater as one ascends.

Enabling, as it does, the pilot to choose his own aerial pathway independent of land or water conditions, flying as



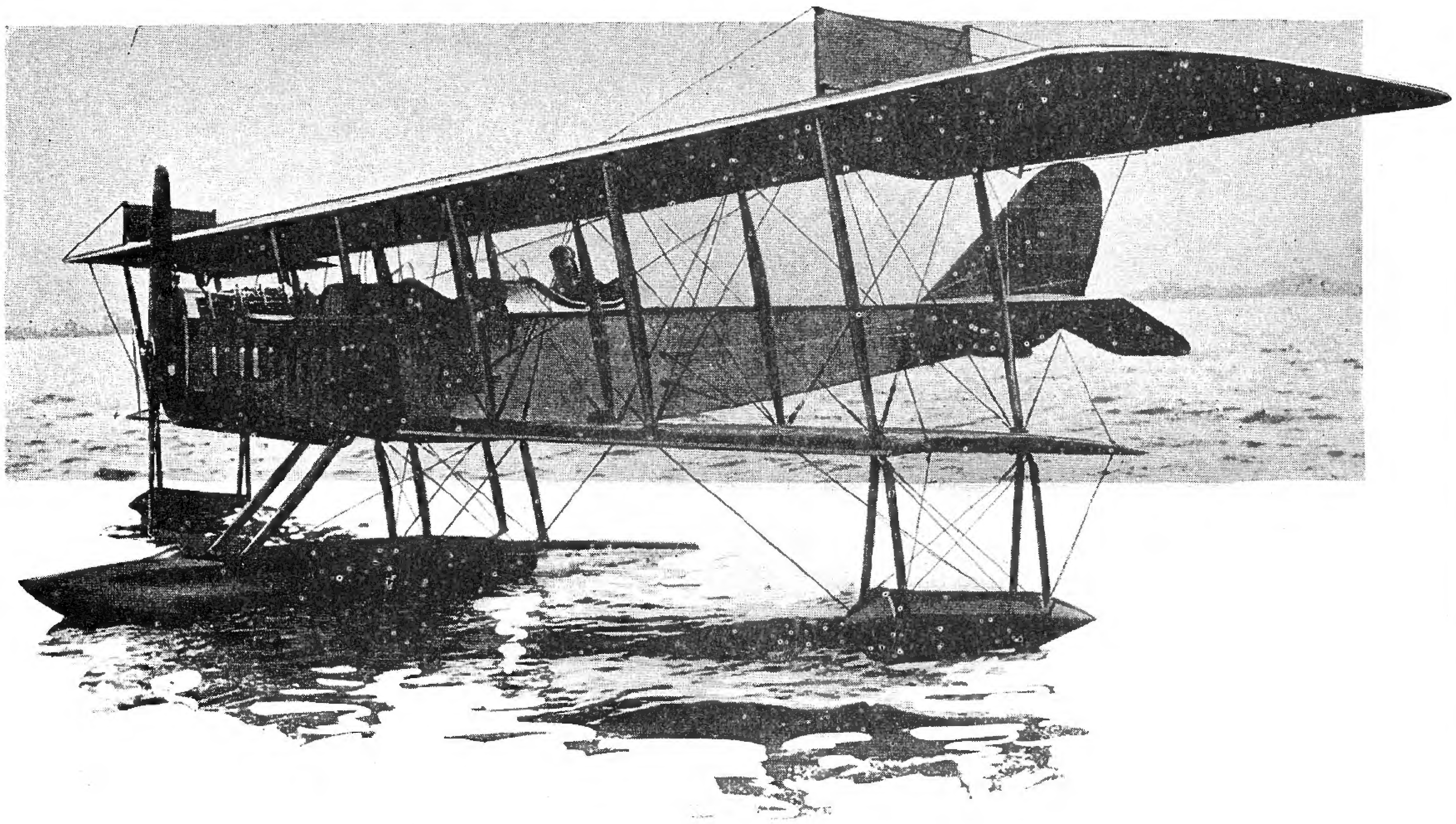
CURTISS MODEL F FLYING BOAT

a sport has an element of satisfaction that all other forms of transportation lack. It has none of the restrictions of terrestrial travel; one is free to come and go as he pleases, like a bird in its native element.

The Curtiss Model F Boat is a type of aerial craft that is easy to fly and easy to land. It will skim over the water like a flying fish, or soar into the clouds like a gull, with the same graceful ease and in less time than its feathered progenitor. It rises from and lands on water with ease and dispatch, even when a considerable sea is running.

Curtiss boats have been flown over 500,000 miles without a serious mishap.

The Model F here shown is the smallest of the Curtiss Flying Boats and was designed primarily as a sportsman's craft. It is of the "pusher" type, has a maximum speed of 65 miles per hour, a minimum speed 45 miles per hour in the air and will climb at the rate of 1,500 feet in 10 minutes. It is built to carry two passengers abreast.



CURTISS MODEL N9—HYDROAEROPLANE

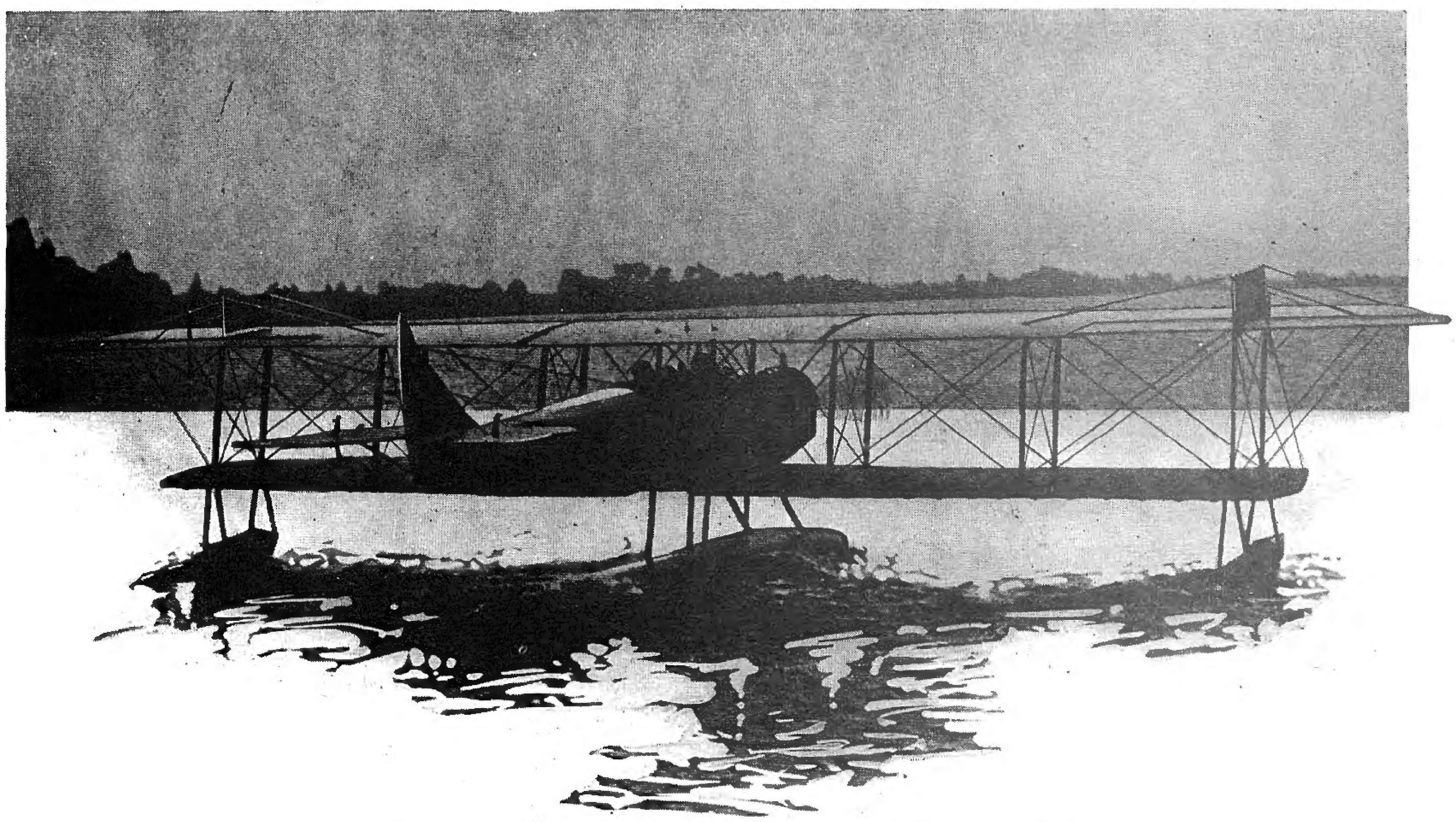
THIS model was designed to meet the Navy's requirements for a water training machine. In its general lines it follows closely the JN4-B land type of military tractor, except that it is, of course, fitted with pontoons in place of wheels.

It is powered with a single Curtiss OXX Motor which develops 100 Horse Power at 1400 R. P. M.

Its maximum wing span is slightly in excess of 53 feet and its overall length is 29 feet, 10 inches. It weighs empty 1,900 pounds and will carry 510 pounds of useful load.

In recent tests held at Newport News it attained a maximum horizontal speed of 70 miles per hour, a minimum flying speed of 45 miles per hour, and climbed 2,000 feet in 10 minutes.

A Hydroaeroplane is peculiarly adapted to scouting purposes and due to its compactness may readily be "knocked-

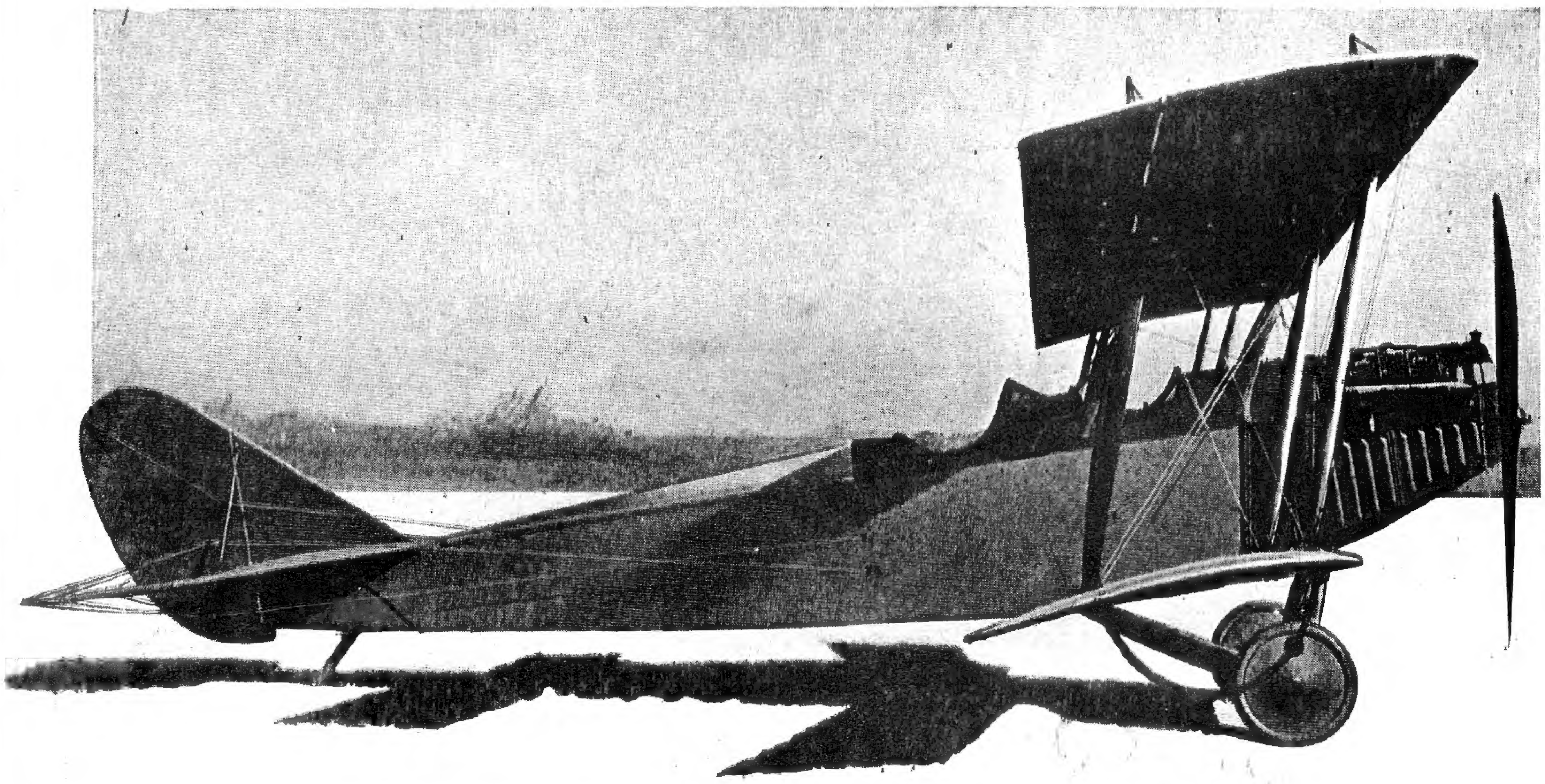


CURTISS MODEL N9—HYDROAEROPLANE

down" and stored on the "mother ship." It also has all the advantages of the land machine, which it resembles in general form and the arrangement of the control. Then, too, the advantages of the Hydroaeroplane cross-country flying are obvious. Its equipment for alighting on or arising from the water makes it possible for an aviator to follow any water course with ease and safety.

It is not necessary to fly high to be able to select a favorable landing place; one can skim along within a few feet of the surface of the water without danger. It will pass the fastest motor boat ever built and will respond to the rudder more quickly than any water craft afloat. Therefore, for aquatic sport, coast patrol service and general water machine training the Curtiss N9 Hydro is ideal.

The N9 has three pontoons—one central float divided into four water-tight compartments, and two small wing pontoons for balancing in a seaway.

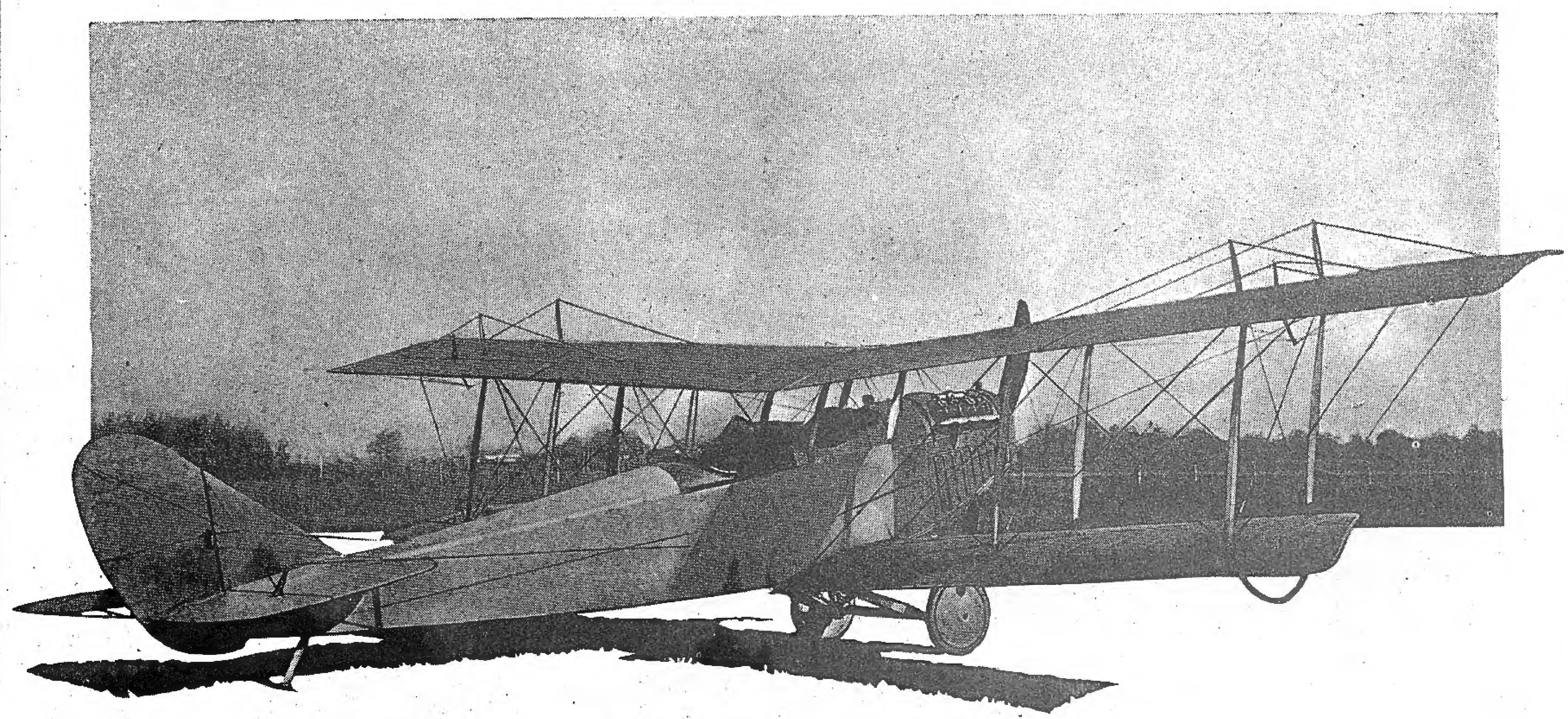


CURTISS MODEL JN4-B—MILITARY TRACTOR

DUE to the fact that this machine has been widely used for training aviators both here and abroad the JN type is probably the best known of all the Curtiss models.

It has a maximum horizontal speed of 75 miles per hour and a minimum of 43 miles per hour, and will climb 3,000 ft. in ten minutes. Powered with an 8-cylinder, "V" type Curtiss "OX" motor, which develops 90 H. P. at 1400 R. P. M. it consumes slightly more than one-half pound of gasoline per H. P. per hour. It is an economical machine for use in training students or general pleasure flying.

It is comparatively light and for its useful load carrying capacity, is very compact. With a wing span of 43 feet, 7⅜ inches and an overall length of 27 feet 3 inches, it weighs empty only 1,405 pounds but will carry a useful load of 485 pounds. It is equipped with dual control, carries two passengers "tandem," each in a separate cockpit.



CURTISS MODEL JN4-B—MILITARY TRACTOR

The Curtiss JN has become so generally regarded as an unusually safe machine on account of its rigid construction, its stability in rough weather conditions and its ease of control as demonstrated by Curtiss aviators in competition with others, that it is, in consequence, acknowledged to be the best aeroplane made for training, exhibitions, contests, and other work of this character when flights are expected regardless of weather conditions.

Instructors say that students taking their "solo work" in this machine are later found to be fully qualified to handle much heavier and faster machines without further instruction or practice. For this reason in all Curtiss Schools and in many of the European training camps Curtiss "JN"s are displacing 'planes of other types. A great number are, at the present time, in actual service here and abroad.

The JN4-B is, as are all Curtiss aeroplanes, regardless of size or type, the composite issue of correct theory, fully tested materials, proper design, careful workmanship, accurate assembly and rigid, painstaking inspection.

CURTISS MODEL "R-4"—MILITARY TRACTOR

THIS is a much larger machine than the "JN" type, having a wing spread slightly in excess of 48 feet and an area of sufficient size so that a total of 1020 pounds, useful load, of which 625 pounds may be fuel, can be carried.

It is powered with a Curtiss Model "V2" motor, which develops 200 H. P. at 1400 R. P. M.

Its maximum horizontal speed is 90 miles per hour and its minimum horizontal speed is 48 miles per hour. It climbs 4000 feet in 10 minutes.

Due to its excess horse power and large wing surface it is capable of great speed and possesses unusual carrying capacity.

In its design are embodied the most modern features of up-to-date construction and its high efficiency has warranted its use under circumstances where lighter and less powerful machines have been found to fail.

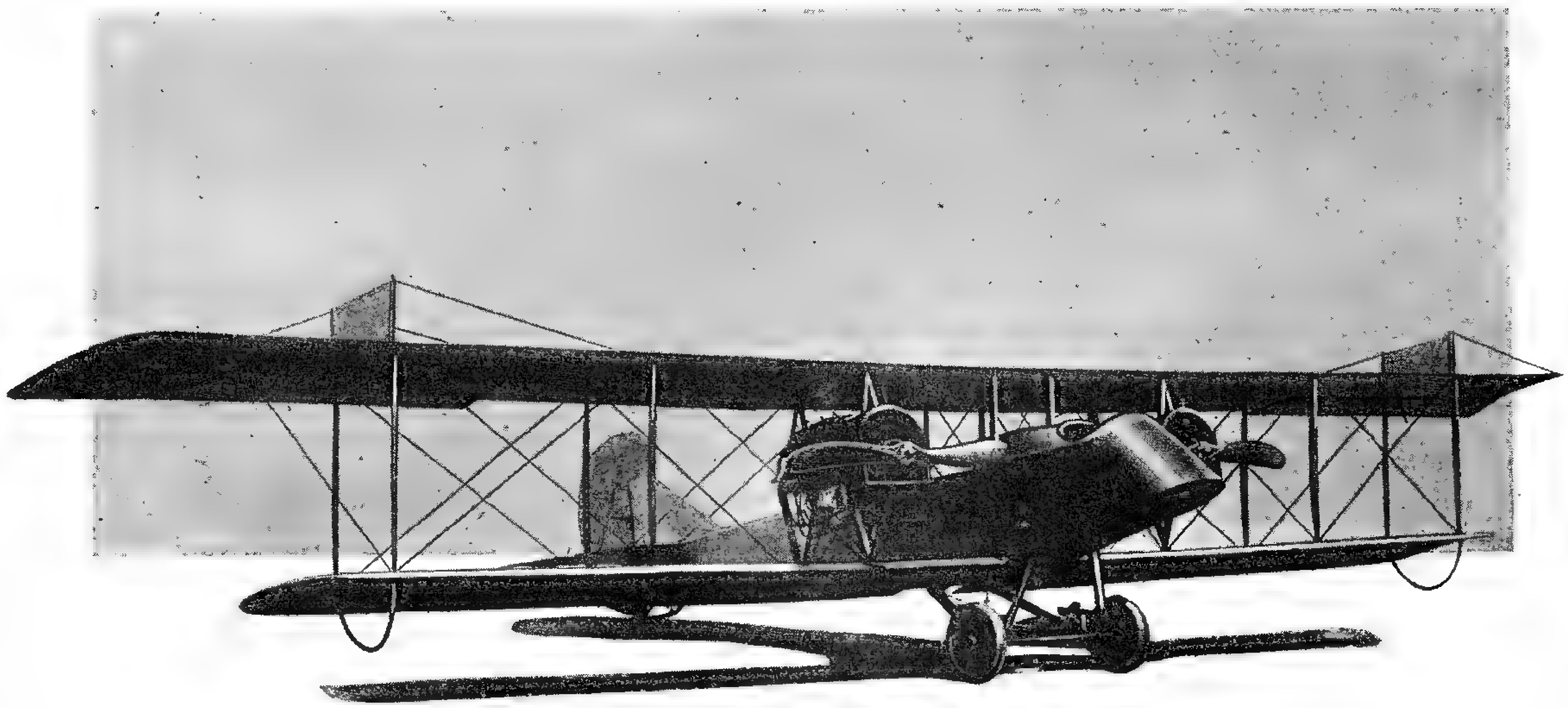
CURTISS MODEL "R-4"—MILITARY TRACTOR

This machine is equipped with dual control, and is built to carry two passengers "tandem"—each in a separate cockpit.

It was with this style of aeroplane that records were established last year for speed and cross-country passenger carrying in flights from Newport News to Washington, D. C., and return, and from Newport News to New York City.

With a modified R4—a larger wing area required to give extra gasoline carrying capacity—Victor Carlstrom also recently flew from Chicago to New York City.

As a "bomber," mail carrier, general utility machine, its rugged construction and great weight carrying ability have made the Curtiss Model R4 a favorite among military men and scores of these tractors are reported to be in actual service in the war zone to-day. Several more are in U. S. Army services on the Border, where they are proving to be dependable, efficient, aerial carriers.



CURTISS MODEL TWIN JN—MILITARY TRACTOR

THE Curtiss Model JN Twin-motored Tractor possesses all the inherent advantages which go to make up a successful military aeroplane. It has high maximum speed and fast climbing ability combined with a slow landing speed and great weight carrying capacity. Although it weighs but 2,110 pounds, empty, it has a useful load carrying capacity of 1,040 pounds.

Two Curtiss Model "OXX" 8-cylinder motors, one located to the left and the other to the right of the fuselage, give this battleplane an available 200 horse power.

It has a maximum horizontal flight speed of 85 miles per hour, a minimum of 48 miles per hour, and a climbing speed under normal conditions, of 4,000 feet in 10 minutes. The machine will fly and climb on one motor.

The front cockpit is placed in the nose of the fuselage, giving to the observer or gunner seated therein an unobstructed range of vision and an extensive field of fire.

The twin-motored machine possesses several advantages over the single-motored type. The two propellers, turning

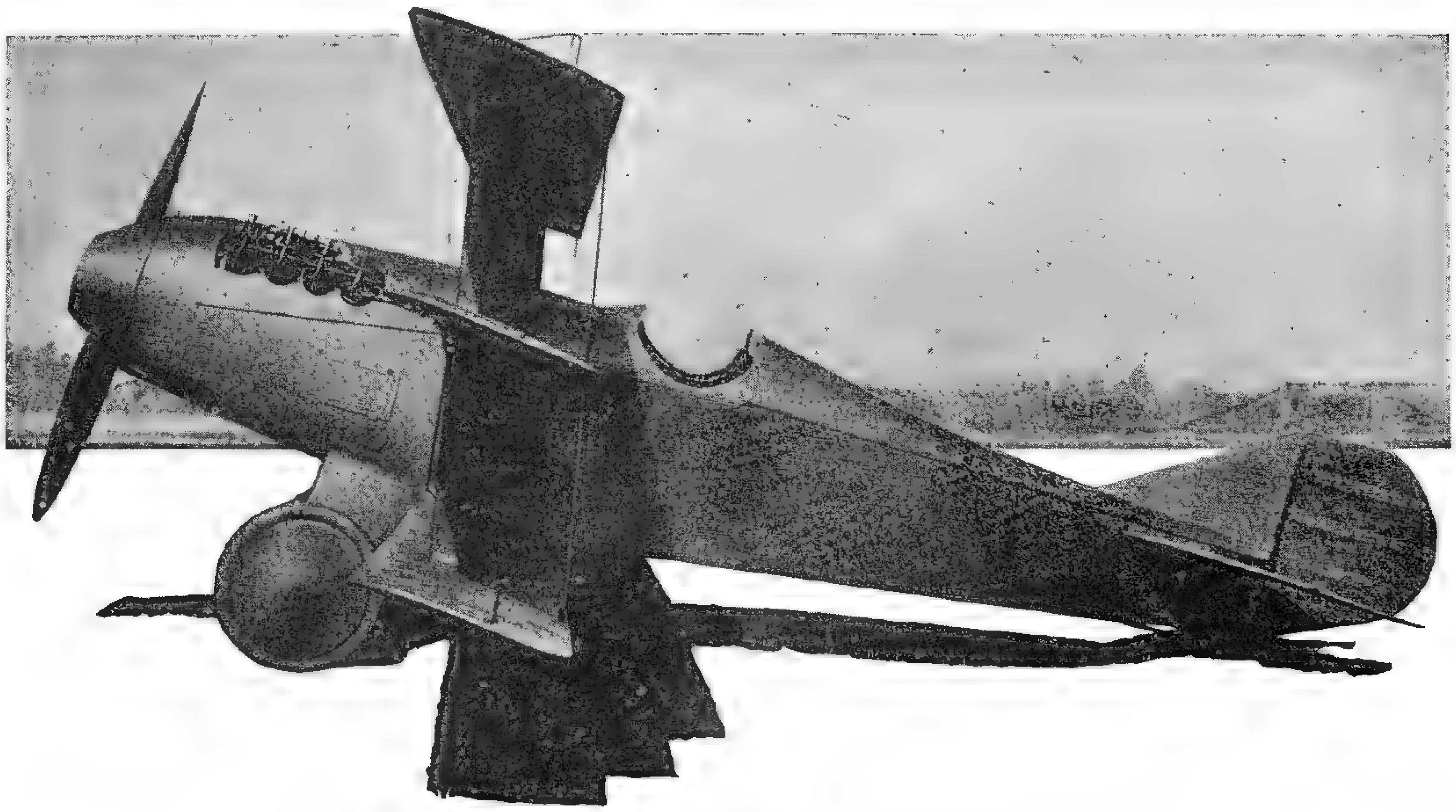
CURTISS MODEL TWIN JN—HYDROAEROPLANE

clockwise and counter-clockwise, respectively, result in equalized torque and gyroscopic effects. The air streams which they produce also have a tendency to make the machine readily controllable under power. Without power, this machine assumes a moderate gliding angle which permits an easy and safe landing.

Another advantage gained by the use of two motors is a decrease, relatively, in the air resistance to the progress of the aeroplane through it. Because there is a smaller, total projected area of the machine lying in the propeller "slip streams" less power is consumed in overcoming head resistance and the surplus thus saved can be utilized for increasing speed or useful load carrying capacity.

By using twin motors it is also possible to equip with greater power without resorting to excessive propeller sizes and speeds.

The Curtiss Twin JN can also be furnished as a hydro by substituting, for its landing gear, a set of pontoons.



CURTISS MODEL S3—TRIPLANE SPEED SCOUT

THE Curtiss Triplane Speed Scout is essentially a one-man machine designed for speed and great climbing ability. Inasmuch as its safety in war, like that of the Torpedo Boat Destroyer in the Navy, depends upon its ability to dart here and there, with a swiftness that precludes successful pursuit, this little craft is so compacted in size and so intensely powered as to be able to make the maximum speed of 115 miles per hour; yet it will fly at the slow speed of 55 miles per hour.

Under normal conditions, it is able to leave the ground in less than 300 feet and it has frequently, in tests, been made to climb 9,000 feet in 10 minutes.

Due to its small size it rapidly becomes imperceptible to the eye after it has been in the air a few minutes. At 5,000 feet it is barely a dot; at 10,000 feet it is out of sight to the average human eye.

It has a total wing spread of 25 feet and an overall length of 19.5 feet and stands less than 9 feet high. It differs quite

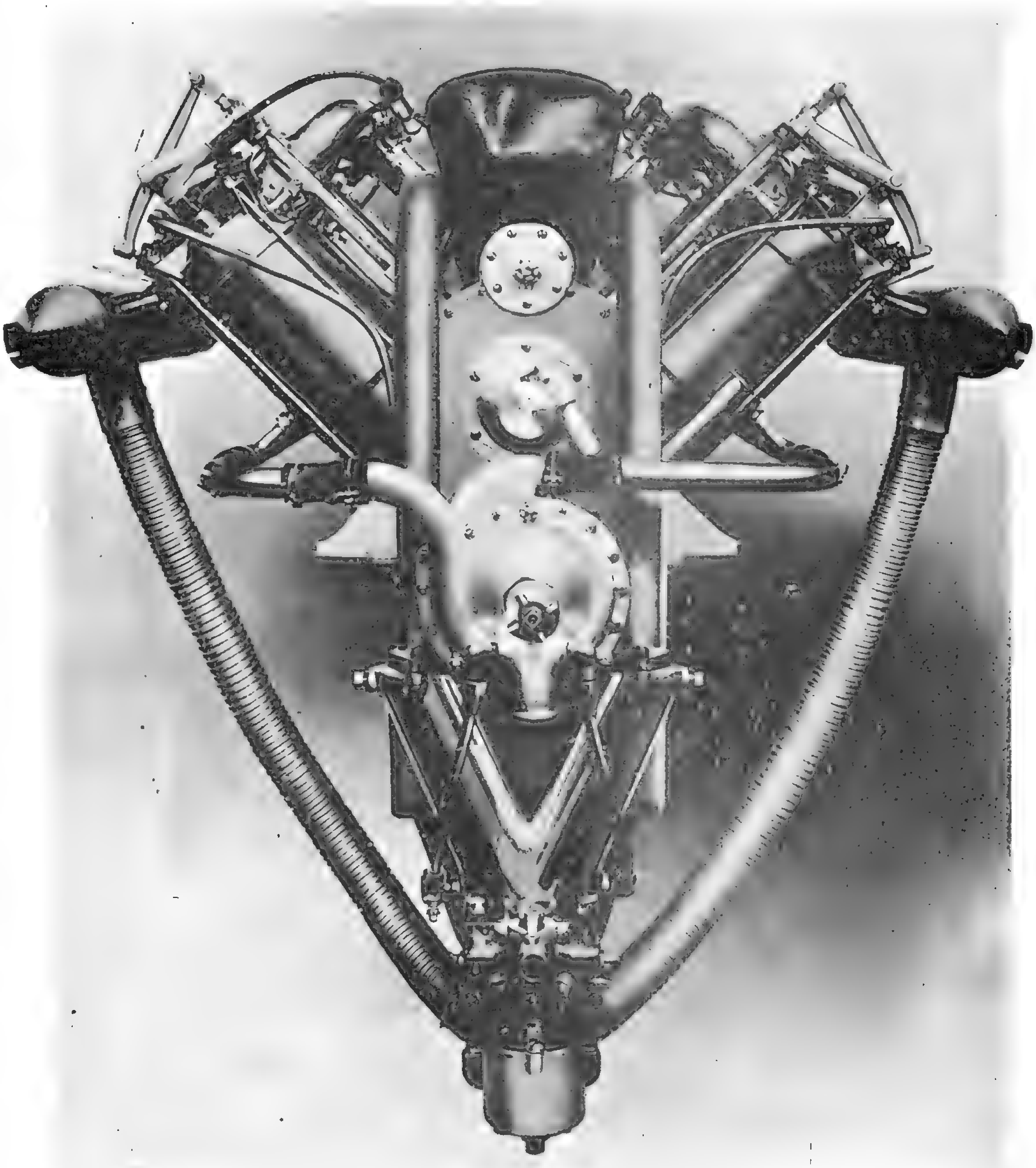
CURTISS MODEL S3—TRIPLANE SPEED SCOUT

materially, in general construction, from any of the other Curtiss models, not only in its triplane wing design but in the style of struts, bracing and general assembly. The entire fuselage is covered and even the propeller hub is fitted with a truncated, streamline hood, which assists in cutting down the wind head-resistances.

Victor Carlstrom, the well-known aviator, says it is one of the nimblest machines he has ever handled. He, easily, attained an altitude of 16,500 feet with it on its second trial flight.

Equipped with wireless it can be made a wonderful aerial observation point and, for military reconnaissance and fast scouting work, promises to excel any other machine so far produced.

As an "Aerial Runabout" or "Speedplane" it cannot fail to please the sportsman aviator. Its trim triplane construction, its well formed streamline fuselage, its speed and ease of handling make it the center of attraction wherever it lands.



# CURTISS "OX" MOTOR

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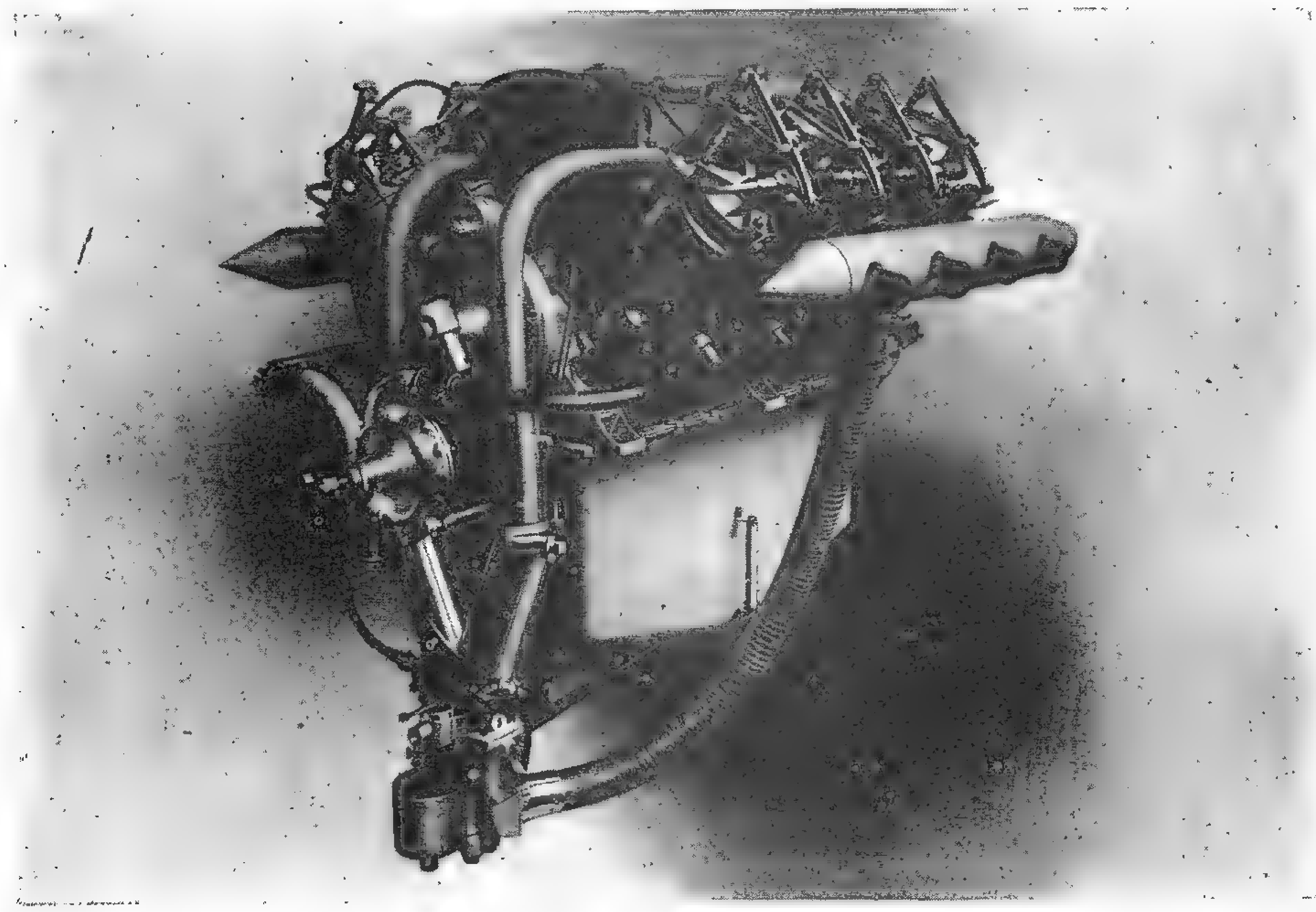
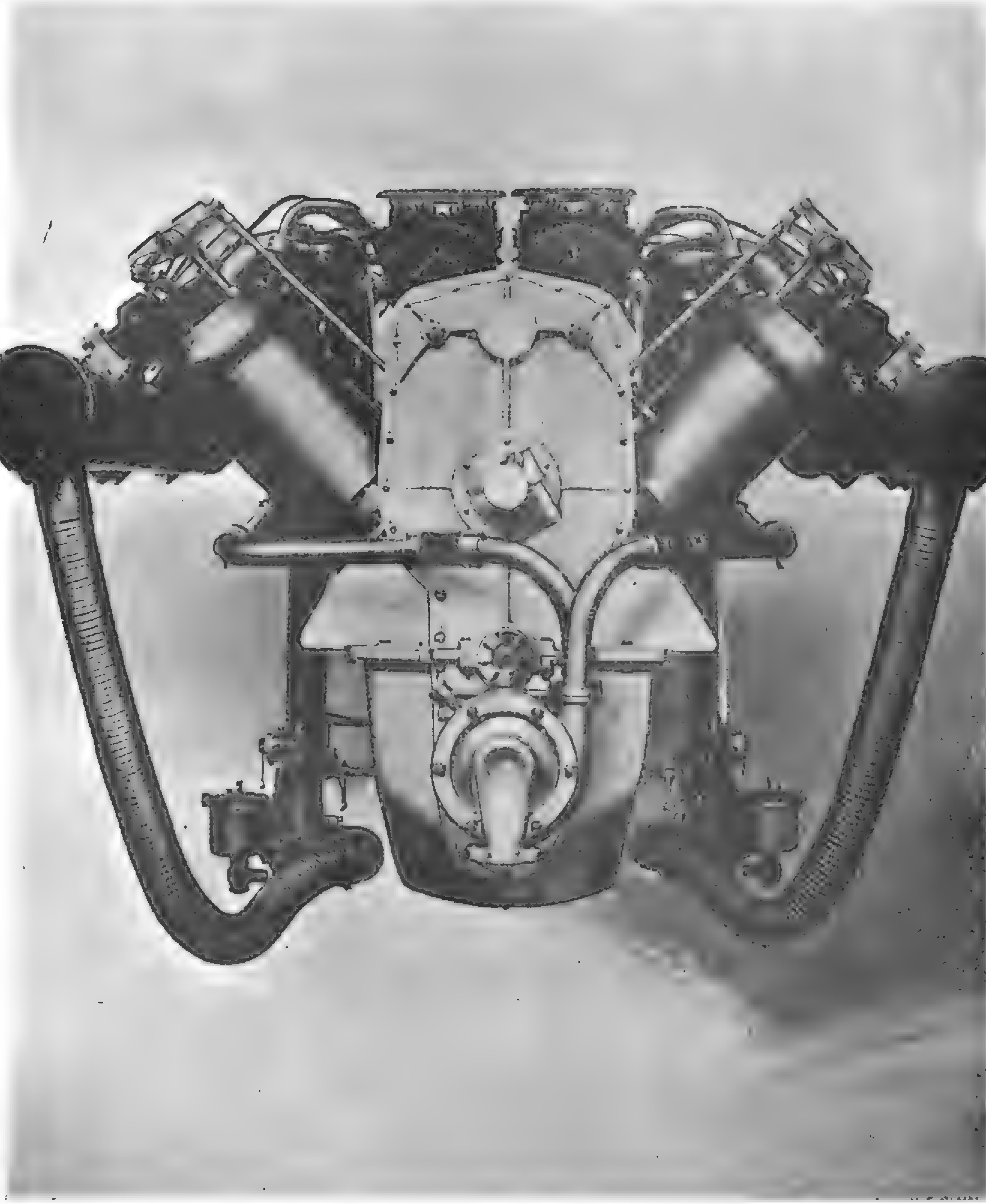
|---|---|
| MODEL | RATED |
| OX | 90 H. P. |
| OXX (¼ INCH LARGER BORE THAN "OX") | 100 H. P. |



# GENERAL DESCRIPTION OF CURTISS MODEL OX MOTOR

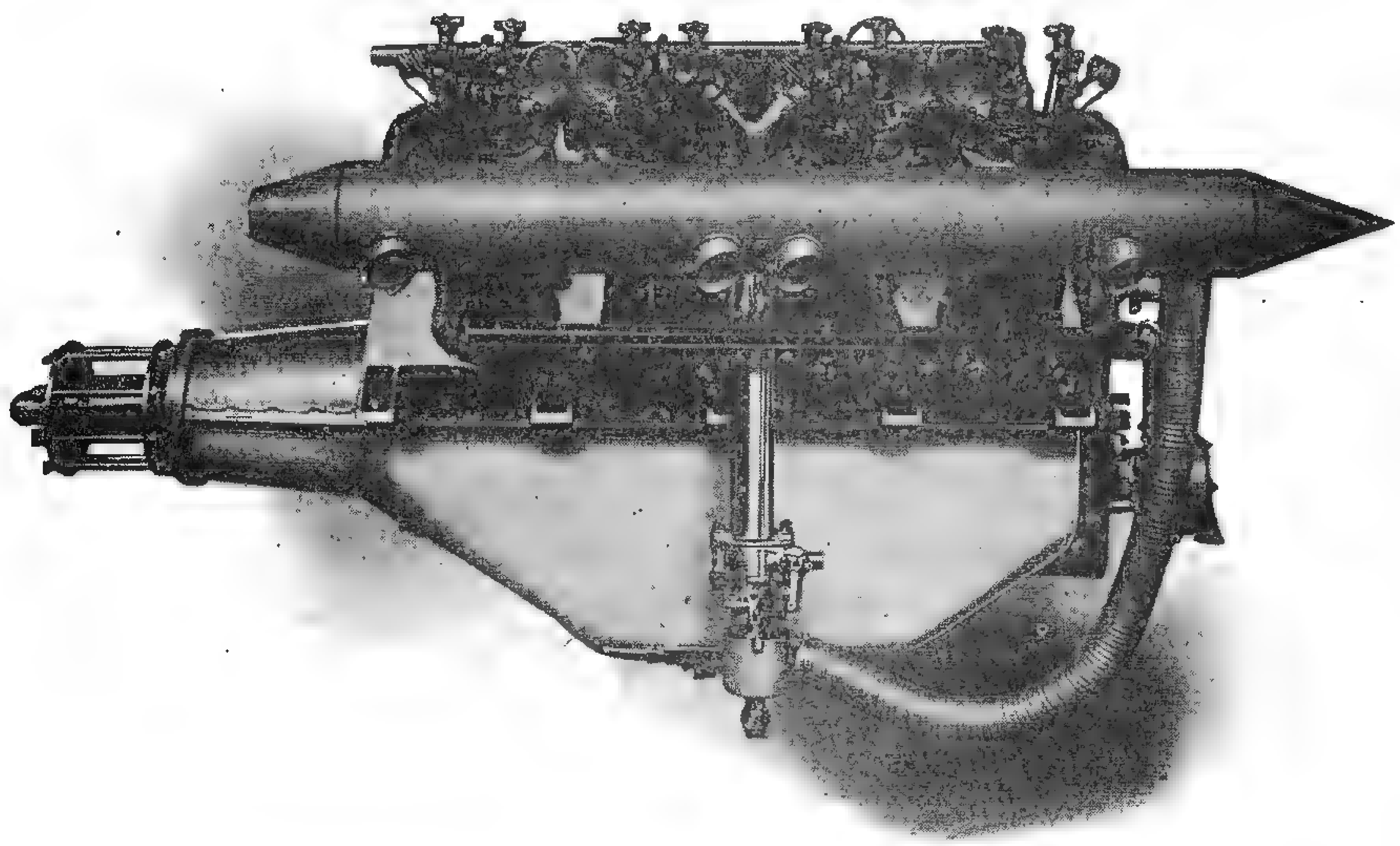
| | | |
|---|---|---|
| TYPE | Eight-cylinder, Vee, four stroke cycle. | |
| HORSE POWER | (Rated) 90 H. P. at 1400 R. P. M. See Power Curve. | |
| IGNITION | High tension, 8-cylinder magneto. | |
| COOLING | Water—centrifugal pump. | |
| OILING | Force feed to all bearing. | |
| BORE | Four inches. | |
| STROKE | Five inches. | |
| GASOLINE CONSUMPTION | 0.60 pounds per Brake Horse Power-Hour. | |
| OIL CONSUMPTION | 0.030 pounds per Brake Horse Power-Hour. | |
| VALVES | One intake, one exhaust per cylinder. | |
| CARBURETOR | Duplex Zenith. | |
| WEIGHTS | Motor with propeller hub, without oil or water | 375 lbs. |
| | Dead weight per rated horse power | 4.17 lbs. |
| INSTALLATION DIMENSIONS | Overall, length | $56\frac{3}{4}$ in. |
| | Overall, width | $29\frac{3}{4}$ in. |
| | Overall, depth | $36\frac{3}{4}$ in. |
| | Width at bed | $12\frac{7}{8}$ in. |
| | Height from bed | $17\frac{3}{4}$ in. |
| | Depth from bed | $12\frac{13}{16}$ in. |
| | At carburetor | 19 in. |
| | Bed Bolts (c to c) | $12\frac{5}{32}$ in. |
| EQUIPMENT | Tools, Shipping Box. | |
| EXTRA EQUIPMENT | Other parts on special order. | |



CURTISS "V2" MOTOR

MODEL V2

RATED 200 H. P.

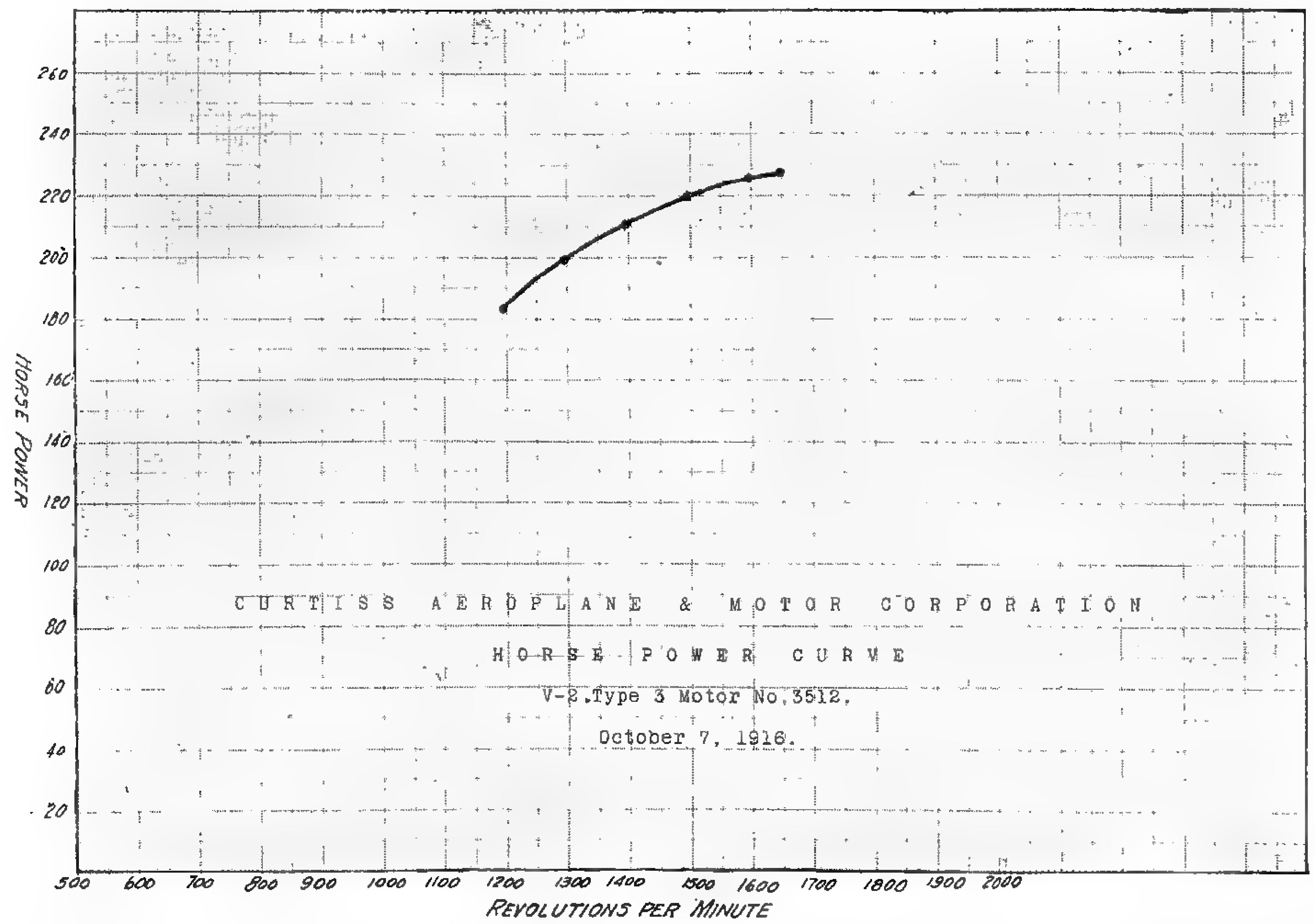


# GENERAL DESCRIPTION OF CURTISS MODEL V2 MOTOR

| | | |
|---|---|---|
| TYPE | Eight-cylinder, Vee, four stroke cycle. | |
| HORSE POWER | (Rated) 200 H. P. at 1400 R. P. M. | |
| IGNITION | Double—two high tension, 8-cylinder magnetos. | |
| COOLING | Water—centrifugal pump. | |
| OILING | Force feed to all bearings. | |
| BORE | Five inches. | |
| STROKE | Seven inches. | |
| GASOLINE CONSUMPTION | 0.54 pounds per Brake Horse Power-Hour. | |
| OIL CONSUMPTION | 0.030 pounds per Brake Horse Power-Hour. | |
| VALVES | One intake, one exhaust per cylinder. | |
| CARBURETORS | Two Zeniths. | |
| WEIGHTS | Motor with propeller hub, without oil or water | 690 lbs. |
| | Dead weight per rated horse power | 3.45 lbs. |
| INSTALLATION DIMENSIONS | Overall, length | $67\frac{15}{16}$ in. |
| | Overall, width | 37 in. |
| | Overall, depth | $34\frac{3}{16}$ in. |
| | Width at Bed Bolts | $15\frac{3}{4}$ in. |
| | Height from bed | $20\frac{1}{4}$ in. |
| | Depth from bed | $13\frac{15}{16}$ in. |
| | Bed Bolts (c to c) | 9 in. |
| EQUIPMENT | Tools and Shipping Box. | |
| EXTRA EQUIPMENT | Other parts on special order. | |

# DETAILS OF CURTISS MODEL V2 MOTOR

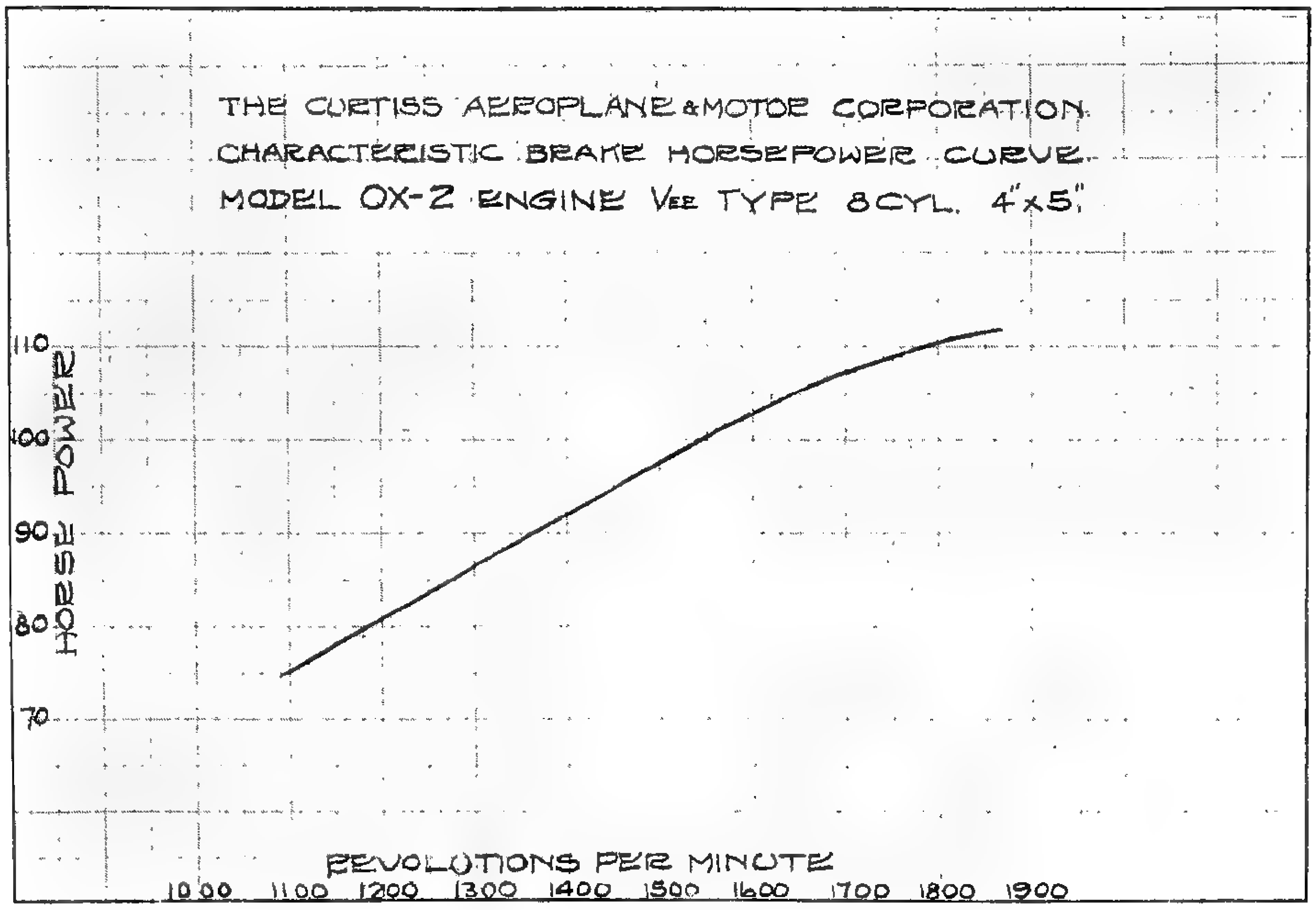
| | |
|---|---|
| Ignition | Two high tension 8-cylinder single spark magnetos with separate sets of spark plugs and wiring. Magnetos are located at top of crank case and driven off timing gears through flexible coupling. One magneto fires inner line of spark plugs, the other the outer. Spark advances interconnected. Leather boots on magnetos. Rubber covers on spark plugs. Spark plugs on 18 mm. diameter and 1½ mm. pitch. |
| Carburetion | Two "Zenith" carburetors with separate manifolds. Each one supplies one bank of four cylinders through water jacketed induction pipes and cast aluminum manifolds. Inter-connected throttles. Auxiliary air intake for altitude adjustment. Carburetors are located on each side of crank case and are supported by steel struts to crank case. Carburetor floats arranged at 90 degrees to longitudinal axis of the engine to insure proper and uniform flow of gasoline to motor during variation of ascent or descent angle. |
| Lubrication | Pressure feed to all bearings—oil is forced by rotary gear pumps from oil reservoir to rear of hollow cam shaft and from this point to following units in the given order: Cam-shaft bearings, timing gears, crank-shaft bearings, connecting-rod bearings, piston pins and cylinder walls. Return by gravity to imperforate partition thence through drain tubes to drain pump and back to oil sump. The oil is screened before entering both pumps by removable screens. Pump is readily detachable. Oil pressure regulating valve fitted to removable plate at base of pump. Nominal pressure at 1400 R. P. M. (Crank shaft) equals sixty pounds. |
| Water Circulation | Duplex centrifugal pump. Each pump circulates water separately from radiator around each set of four cylinders and return. Water pump is studded to gear end of crank-case and driven by enclosed gears from crank shaft. |
| Cylinders | Steel forgings, machined all over. Top wall of water jacket welded on. Monel metal side wall, welded on. Cylinder wall ribbed on inside of jacket for strength. Cylinders bolted to crank case by twelve studs. Cylinders staggered. |
| Valves | Poppet type in head. Intake, nickel steel. Exhaust, tungsten steel. |
| Valve Springs | Special steel, heavily nickel plated. Intake, coil type. Exhaust, cantilever type. |
| Valve Cages | Intake; cast aluminum with cast-iron valve stem bushing. Exhaust, cast-iron ribbed outside for cooling and strength. Valve seats in cylinder heads. Exhaust valve cage contains hole for priming. |
| Rocker Arms | "H" section forging, case-hardened all over and nickel plated. Valve clearance adjustment on upper end of push rod. |
| Push Rods | Barrel type, tubular rod with ball end at valve lifter. Yoked end adjustable on threaded portion of rod, and locked by lock nut and cotter. |
| Cam Followers | Plunger type; steel, case-hardened and ground. |
| Cam Follower Guides | Bearing, bronze. Studded to case by two studs. |
| Cam-Shaft | Drilled hollow. Drop forged with cams integral. Separate cam for each valve. Cams, case-hardened. Five bearings. All wearing surfaces ground. Guides, manganese bronze; studded to case. |
| Cam-Shaft Bearings | Aluminum alloy castings. Split type bolted together and held in crank case by locked screw. |
| Pistons | Aluminum alloy die castings, flat-head type, deep ribbed for strength and cooling. Piston pin bearings are in piston without bushings. Two cast-iron eccentric rings. |
| Piston Pins | Chrome vanadium steel—drilled hollow, case-hardened and ground. Tube spun inside to permit all oil to flow through pin bearings to cylinder walls. Pins pressed in connecting rods and held by large locked set screw through connecting rod. |
| Connecting Rods | Chrome vanadium steel. H-beam forgings, machined all over and heat treated. Copper oil tube from lower to upper bearing held by clamps riveted on. |
| Connecting-Rod Bearings | Bronze backed, babbitt lined. Reamed to crank shaft. Ribbed construction at side to retain oil. |




| | |
|---|---|
| Crank-Shaft . . . . . . | Chrome nickel steel forging, finished all over and drilled hollow and heat treated. Four throw, five main bearings. All bearings ground. End of shaft tapered one in ten with twelve splines for propeller hub. |
| Crank-Shaft Bearings . | Bronze backed, babbitt lined. Line reamed to running clearance of crank-shaft. |
| Thrust Bearings . . . . | Large annular ball-bearing and double-thrust ball-bearing for tractor or pusher use without change. Bearings mounted in aluminum housing bolted in crank case. Lubricated from hollow crank-shaft. |
| Crank Case . . . . . . | Aluminum alloy casting. Box type ribs. Ten motor support arms. Lower half bolted on. Timing gear housing cast integral. |
| Timing Gears . . . . . . | Spur type. Crank-shaft gear steel forging, shrunk and keyed on shaft. Cam-shaft gear, special manganese bronze, keyed on cam-shaft and held with retaining cap screw. |
| Magneto Drive . . . . . | Steel idler driven off cam-shaft gear. Drives both magneto gears. All these gears have ball-bearing shafts. Flexible connections between magnetos and gear shafts. |
| Water Pump. . . . . . . | Centrifugal type with duplex inlets and outlets. Cast aluminum housing and blades. Gear driven off crank-shaft. Studded to front end of crank case. |
| Oil Pump . . . . . . . . | Rotary gears comprising three independent pumps, one for feed and two for drain, located in lower half of case driven from timing gears. |
| Intake Manifolds . . . . | Brass tubing. |
| Exhaust Pipes. . . . . . | Steel tubes bolted to exhaust ports. |
| Water Piping . . . . . . | Brass tubing, nickel-plated. Rubber hose connections with special clamps. |
| Bolts, Nuts, Etc. . . . | All nuts and screws are securely locked, cotter pinned and wired in series. |
| Extra Equipment . . . . | Can be furnished on special order: Exhaust manifold, welded steel stamping held by single bolt through each end exhaust pipe. Muffler, special streamline muffler bolted to exhaust manifold. Air pump, drive from cam shaft at front end of motor, capacity 0.332 cubic feet of air per minute against four pounds per square inch pressure above one atmosphere at 1400 R. P. M., crank-shaft speed. Tachometer drive; special gearing enclosed in aluminum housing screwed to air pump, or gear case (if air pump is not specified), driven from cam-shaft gear. |

# DETAILS OF CURTISS MODEL OX MOTOR

| | |
|---|---|
| Ignition | One high tension, single spark, 8-cylinder magneto located at top of crank case and driven off timing gears at front. Leather boot on magneto. Rubber covers on spark plugs. Spark plugs metric thread 18 mm., 1½ mm. pitch. |
| Carburetor | Duplex "Zenith." Each intake supplies one bank of four cylinders through separate manifolds. Lower end of manifolds water jacketed. Auxiliary air intake in manifolds with hand control for altitude adjustment. Carburetor located under front end of motor, and braced by steel struts to crank case. |
| Lubrication | Pressure feed. The oil is forced from lowest point of sump by gear-pump to rear end of hollow cam-shaft, through pressure adjusting valve through cam-shaft to timing gears and all cam-shaft bearings, thence through tubes to crank-shaft bearings and through crank-shaft throws to connecting-rod bearings. Gravity return to splash pan, and oil reservoir. Oil pump is located at bottom of propeller end of crank case and is driven off crank-shaft through bevel gear. Removable oil screen at lowest point of sump. Oil pressure from forty to sixty pounds at 1400 R. P. M. |
| Water Circulation | Centrifugal pump bolted to propeller end of crank case and driven direct off end of crank-shaft through coupling. |
| Cylinders | Best grade grey iron casting, each casting embodying one cylinder with valve chambers and valve stem guides cast integral. Monel metal jackets brazed on. Outside of cylinder heavily nickel-plated to prevent rust. Cylinders bolted to crank case by eight nickel steel, heat-treated studs, four of which extend to top of cylinder. |
| Valves | Poppet type in head. Intake, nickel steel. Exhaust, tungsten steel. |
| Valve Springs | Coil Type. |
| Valve Cages | Valves seat direct in cylinder head casting. |
| Rocker Arms | Exhaust, drop forgings, case-hardened and nickel-plated. Intake cast aluminum. |
| Cam Followers | Plunger type, case-hardened steel. |
| Cam Follower Guides | Manganese bronze, bolted to case. |
| Cam Shaft | Steel, case hardened. Eight double acting cams integral. Five bearings drilled hollow for oiling system, bearings and cams ground. |
| Cam-Shaft Bearings | Aluminum alloy castings. Split type bolted together and held in crank case by locked set screw. |
| Pistons | Aluminum alloy castings with deep ribs for strength and cooling. Two cast-iron eccentric rings. |
| Piston Pins | Chrome nickel steel, heat treated. Drilled hollow, case-hardened and ground. Pin bearings in aluminum of piston bosses. Pins pressed in connecting rods and held by locked set screw. |
| Connecting Rods | Chrome Vanadium steel forgings, "H" section machined all over and heat treated. |
| Connecting-Rod Bearings | Bronze backed, babbitt-lined. Reamed for crank-shaft. Held in rod by four brass rivets. Cap bolted on with two bolts. |
| Crank-Shaft | Heat-treated chrome nickel steel forging, finished all over and drilled hollow. Four throw, five main bearings. All bearings ground. End of shaft splined, tapered and threaded for propeller hub. |
| Crank-Shaft Bearings | Bronze backed, babbitt lined. Line reamed to crank-shaft. End caps aluminum, others steel. All caps held on with two large bolts. |




| | |
|---|---|
| Thrust Bearing . . . . | Large annular and thrust ball-bearing mounted in extended rear end of crank case. By reversing bearing, engine may be converted from tractor to pusher type. |
| Crank Case . . . | Aluminum alloy casting with heavy deep-ribbed decks. Six motor support arms. Lower half bolted on. |
| Timing Gears . . . . . | Spur type. Crank-shaft gear steel forging shrunk and keyed on shaft. Cam shaft gear special manganese bronze, keyed on cam-shaft and held with retaining cap screw. |
| Magneto Drive . . . . . | Steel-gear driven from cam shaft gear at each end. Ball bearing mounted. Flexible coupling to magneto shaft. |
| Water Pump . . . . . . . | Centrifugal type. Cast aluminum housing, bronze blades. |
| Tachometer Drive . . . | Shaft gearing in aluminum housing bolted on face of timing gear housing. Dog drive direct off cam shaft gearing. |
| Exhaust Pipe . . . . . . | Steel tubes bolted to exhaust ports. |
| Water Piping . . . . . | Steel tubing, nickel-plated. Reinforced rubber hose connections with special clamps. |
| Bolts, Nuts, Etc. . . . . | All nuts, screws, etc., are cotter pinned or lock wired in series. |
| Extra Equipment . . . . | Can be furnished on special order:<br>Exhaust manifolds, welded steel stampings held by single bolt through end exhaust pipes.<br>Muffler—special streamline muffler bolted to exhaust manifold.<br>Air pump-drive from cam shaft at front end of motor. Capacity—0.332 cubic feet of air per minute against four pounds per square inch pressure above one atmosphere at 1400 R. P. M crank-shaft speed.<br>Starting lever—manual starting device operating through dog clutch to crank-shaft, positive safety device to disengage clutch. Aluminum bracket bolted to engine bed. |

# SPECIFICATIONS

## CURTISS MODEL S3 TRIPLANE MILITARY SCOUT

General Dimensions:

| | |
|---|---|
| Wing Span—Upper Plane | 25 ft. |
| Wing Span—Middle Plane | 25 ft. |
| Wing Span—Lower Plane | 25 ft. |
| Depth of Wing Chord | 24 in. |
| Gap between Wings | 30 in. |
| Stagger | $9\frac{1}{2}$ degrees |
| Length of Machine overall | 19 ft. 6 in. |
| Height of Machine overall | 8 ft. $7\frac{1}{4}$ in. |
| Angle of Incidence | $3\frac{1}{2}$ degrees |
| Dihedral Angle—dihedral on upper o in.; dihedral, lower | $4\frac{1}{2}$ degrees |
| Sweepback | 0 degrees |
| Wing Curve | R. A. F. No. 6 |
| Horizontal Stabilizer-Angle of Incidence | 0 degrees |

Areas:

| | |
|---|---|
| Wings—Upper | 50.00 sq. ft. |
| Wings—Middle | 46.33 sq. ft. |
| Wings—Lower | 46.33 sq. ft. |
| Horizontal Stabilizer | 7.10 sq. ft. |
| Vertical Stabilizer | 2.30 sq. ft. |
| Elevator (each 3.70 sq. ft.) | 7.40 sq. ft. |
| Rudder—Vertical | 5.30 sq. ft. |
| Total Supporting Surface | 142.66 sq. ft. |
| Loading (weight carried per sq. ft. of Supporting Surface) | 9.25 lbs. |

Weights:

| | |
|---|---|
| Net Weight—Machine Empty | 970 lbs. |
| Gross Weight—Machine and Load | 1320 lbs. |
| Useful Load— | 350 lbs. |

| | |
|---|---|
| Fuel | 155 lbs. |
| Oil | 30 lbs. |
| Pilot | 165 lbs. |
| Total | 350 lbs. |

## SPECIFICATIONS—CONTINUED

PERFORMANCE:

| | |
|---|---|
| Speed—Maximum—Horizontal Flight | 115 miles per hour |
| Speed—Minimum—Horizontal Flight | 55 miles per hour |
| Climbing Speed | 9,000 feet in 10 minutes |

MOTOR:

| | |
|---|---|
| Model OXX—8-Cylinder, Vee, Four-Stroke Cycle | Water cooled |
| Horse Power—(Rated) at 1400 R. P. M. | 100 |
| Bore and Stroke | $4\frac{1}{4}$ in. x 5 in. |
| Fuel Tank Capacity | 25 gals. |
| Oil Capacity Provided—Crankcase | 4 gals. |
| Fuel Consumption per Brake Horse Power per Hour | 0.60 lbs. |
| Oil Consumption per Brake Horse Power per Hour | 0.030 lbs. |

PROPELLER:

| | |
|---|---|
| Material | Wood |
| Pitch—according to requirements of performance. | |
| Diameter—according to requirements of performance. | |
| Direction of Rotation (viewed from pilot's seat) | Clockwise |

DETAILS:

Control Braces of tail units not exposed to wind draft.
Triple Ailerons.
Landing Gear Wheel, size 26 in. x 3 in.
Standard Equipment—Tachometer, oil gauge, gasoline gauge; complete set of tools.
Other equipment on special order.

# SPECIFICATIONS

## CURTISS MODEL TWIN JN—MILITARY TRACTOR

GENERAL DIMENSIONS:

| | |
|---|---|
| Wing Span—Upper Plane | 52 ft. 9⅜ in. |
| Wing Span—Lower Plane | 43 ft. 1¾ in. |
| Depth of Wing Chord | 59½ in. |
| Gap between Wings | 62½ in. |
| Stagger | 9½ degrees |
| Length of Machine overall | 29 ft. 4 in. |
| Height of Machine overall | 10 ft. 8½ in. |
| Angle of Incidence | 2 degrees |
| Dihedral Angle | 4½ degrees |
| Sweepback | 0 degrees |
| Wing Curve | Eiffel No. 36 |
| Horizontal Stabilizer-Angle of Incidence | 0 degrees |

AREAS:

| | |
|---|---|
| Wings—Upper | 218 sq. ft. |
| Wings—Lower | 197 sq. ft. |
| Ailerons (each 17.64 sq. ft.) | 35.28 sq. ft. |
| Horizontal Stabilizer | 40.40 sq. ft. |
| Vertical Stabilizer | 7.10 sq. ft. |
| Elevators (each 13.30 sq. ft.) | 26.60 sq. ft. |
| Rudder | 18 sq. ft. |
| Total Supporting Surface | 450.28 sq. ft. |
| Loading (weight carried per sq. ft. of Supporting Surface) | 7.00 lbs. |
| Loading (per B. H. P.) | 15.44 lbs. |

WEIGHTS:

| | |
|---|---|
| Net Weight—Machine Empty | 2110 lbs. |
| Gross Weight—Machine and Load | 3150 lbs. |
| Useful Load— | 1040 lbs. |

| | |
|---|---|
| Fuel | 650 lbs. |
| Oil | 60 lbs. |
| Pilot | 165 lbs. |
| Passenger or other Load | 165 lbs. |
| Total | 1,040 lbs. |

## SPECIFICATIONS—CONTINUED

PERFORMANCE:

| | |
|---|---|
| Speed—Maximum—Horizontal Flight | 85 miles per hour |
| Speed—Minimum—Horizontal Flight | 48 miles per hour |
| Climbing Speed | 4,000 feet in 10 minutes |

MOTORS:

| | |
|---|---|
| Model OXX—Two 8-Cylinder, Vee, Four-Stroke Cycle | Water cooled |
| Horse Power—(Rated) at 1400 R. P. M. (100 H. P. each) | 200 |
| Weight per rated Horse Power | 4.01 lbs. |
| Bore and Stroke | $4\frac{1}{4}$ in. x 5 in. |
| Fuel Consumption per Hour | 20 gals. |
| Fuel Tank Capacity | 105 gals. |
| Oil Capacity Provided—Crankcase (each motor 4 gals.) | 8 gals. |
| Fuel Consumption per Brake Horse Power per Hour (each motor 0.60 lbs.) | 1.20 lbs. |
| Oil Consumption per Brake Horse Power per Hour (each motor .030 lbs.) | .060 lbs. |

PROPELLER:

| | |
|---|---|
| Material | Wood |

Pitch—according to requirements of performance.

Diameter—according to requirements of performance.

| | |
|---|---|
| Direction of Rotation (as viewed from pilot's seat) | Left motor—Clockwise<br>Right motor—Anti-clockwise |

DETAILS:

Circular Radiators.

Wings Skids at outer end of lower panels.

Tail Skid independent of Tail Post.

Landing Gear Wheel, size 32 in. x $4\frac{1}{2}$ in.

Standard Equipment—Tachometer, oil gauge, gasoline gauge; complete set of tools.

Other equipment on special order.

The above machine is also built as a hydroaeroplane equipped with two main pontoons in place of landing gear.

# SPECIFICATIONS

## CURTISS MODEL R4—MILITARY TRACTOR

General Dimensions:

| | |
|---|---|
| Wing Span—Upper Plane | 48 ft. $4\frac{1}{8}$ in. |
| Wing Span—Lower Plane | 38 ft. $5\frac{1}{8}$ in. |
| Depth of Wing Chord | $75\frac{1}{16}$ in. |
| Gap between Wings | $74\frac{1}{4}$ in. |
| Stagger | $10\frac{3}{4}$ in. |
| Length of Machine overall | 28 ft. $11\frac{3}{4}$ in. |
| Height of Machine overall | 13 ft. $2\frac{1}{4}$ in. |
| Angle of Incidence | $2\frac{1}{2}$ degrees |
| Dihedral Angle | 3 degrees |
| Sweepback | 0 degrees |
| Wing Curve | R. A. F. No. 6 |
| Horizontal Stabilizer-Angle of Incidence | 0 degrees |

Areas:

| | |
|---|---|
| Wings—Upper | 257.34 sq. ft. |
| Wings—Lower | 193.18 sq. ft. |
| Ailerons (upper, 16.92; lower, 10.26) | 54.36 sq. ft. |
| Horizontal Stabilizer | 40.40 sq. ft. |
| Vertical Stabilizer | 7.10 sq. ft. |
| Elevators (each 13.75 sq. ft.) | 27.50 sq. ft. |
| Rudder | 16.50 sq. ft. |
| Total Supporting Surface | 504.88 sq. ft. |
| Loading (weight carried per sq. ft. of Supporting Surface) | 6.42 lbs. |
| Loading (per B. H. P.) | 15.89 lbs. |

Weights:

| | |
|---|---|
| Net Weight—Machine Empty | 2225 lbs. |
| Gross Weight—Machine and Load | 3245 lbs. |
| Useful Load | 1020 lbs. |

| | |
|---|---|
| Fuel | 625 lbs. |
| Oil | 65 lbs. |
| Pilot | 165 lbs. |
| Passenger or other Load | 165 lbs. |
| Total | 1,020 lbs. |

## SPECIFICATIONS—CONTINUED

PERFORMANCE:

| | |
|---|---|
| Speed—Maximum—Horizontal Flight | 90 miles per hour |
| Speed—Minimum—Horizontal Flight | 48 miles per hour |
| Climbing Speed | 4,000 feet in 10 minutes |

MOTOR:

| | |
|---|---|
| Model V2—8-Cylinder, Vee, Four-Stroke Cycle | Water cooled |
| Horse Power—(Rated) at 1400 R. P. M. | 200 |
| Weight per rated Horse Power | 3.45 lbs. |
| Bore and Stroke | 5 in. x 7 in. |
| Fuel Consumption per Hour | 18 gals. |
| Fuel Tank Capacity | 100 gals. |
| Oil Capacity Provided—Crankcase | 8 gals. |
| Fuel Consumption per Brake Horse Power per Hour | 0.54 lbs. |
| Oil Consumption per Brake Horse Power per Hour | 0.030 lbs. |

PROPELLER:

Material . . . . . . . . . . Wood

Pitch—according to requirements of performance.

Diameter—according to requirements of performance.

Direction of Rotation (viewed from pilot's seat) . . . . . . Clockwise

DETAILS:

One Pressure and Two Gravity Gasoline Tanks Located in Fuselage.

Balanced Rudder.

Tail Skid independent of Tail Post.

Landing Gear Wheel, size 32 in. x $4\frac{1}{2}$ in.

Standard Equipment—Tachometer, oil gauge, gasoline gauge, complete set of tools.

Other equipment on special order.

# SPECIFICATIONS

## CURTISS MODEL JN4-B—MILITARY TRACTOR

General Dimensions:

| | |
|---|---|
| Wing Span—Upper Plane | 43 ft. $7\frac{3}{8}$ in. |
| Wing Span—Lower Plane | 33 ft. $11\frac{1}{4}$ in. |
| Depth of Wing Chord | $59\frac{1}{2}$ in. |
| Gap between Wings | $62\frac{8}{16}$ in. |
| Stagger | $12\frac{5}{16}$ in. |
| Length of Machine overall | 27 ft. 3 in. |
| Height of Machine overall | 9 ft. $10\frac{1}{2}$ in. |
| Angle of Incidence | 2 degrees |
| Dihedral Angle | 1 degree |
| Sweepback | 0 degrees |
| Wing Curve | Eiffel No. 36 |
| Horizontal Stabilizer—Angle of Incidence | 0 degrees |

Areas:

| | |
|---|---|
| Wings—Upper | 172.15 sq. ft. |
| Wings—Lower | 152.26 sq. ft. |
| Ailerons (each 17.64 sq. ft.) | 35.28 sq. ft. |
| Horizontal Stabilizer | 28.70 sq. ft. |
| Vertical Stabilizer | 3.80 sq. ft. |
| Elevators (each 11.00 sq. ft.) | 22.00 sq. ft. |
| Rudder | 12.00 sq. ft. |
| Total Supporting Surface | 359.69 sq. ft. |
| Loading (weight carried per sq. ft. of Supporting Surface) | 5.26 lbs. |
| Loading (per B. H. P.) | 20.55 lbs. |

Weights:

| | | |
|---|---|---|
| Net Weight—Machine Empty | | 1405 lbs. |
| Gross Weight—Machine and Load | | 1890 lbs. |
| Useful Load— | | 485 lbs. |
| Fuel | 125 lbs. | |
| Oil | 30 lbs. | |
| Pilot | 165 lbs. | |
| Passenger or other Load | 165 lbs. | |
| Total | 485 lbs. | |

## SPECIFICATIONS—CONTINUED

PERFORMANCE:

| | |
|---|---|
| Speed—Maximum—Horizontal Flight | 75 miles per hour |
| Speed—Minimum—Horizontal Flight | 43 miles per hour |
| Climbing Speed | 3,000 feet in 10 minutes |

MOTOR:

Model OX—8-Cylinder, Vee—Four-Stroke Cycle, Water cooled

| | |
|---|---|
| Horse Power—(Rated) at 1400 R. P. M. | 90 |
| Weight per rated Horse Power | 4.33 lbs. |
| Bore and Stroke | 4 in. x 5 in. |
| Fuel Consumption per Hour | 9 gals. |
| Fuel Tank Capacity | 20 gals. |
| Oil Capacity Provided—Crankcase | 4 gals. |
| Fuel Consumption per Brake Horse Power per Hour | 0.60 lbs. |
| Oil Consumption per Brake Horse Power per Hour | 0.030 lbs. |

PROPELLER:

Material . . . . . Wood

Pitch—according to requirements of performance.

Diameter—according to requirements of performance.

Direction of Rotation (as viewed from pilot's seat) . . . . . Clockwise

DETAILS:

Dual Control.

Tail Skid independent of Tail Post.

Landing Gear Wheels, size 26 in. x 4 in.

Standard Equipment—Tachometer, oil gauge, gasoline gauge, complete set of tools.

Other equipment on special order.

# SPECIFICATIONS

## CURTISS MODEL N9—HYDROAEROPLANE

GENERAL DIMENSIONS:

| | |
|---|---|
| Wing Span—Upper Plane | 53 ft. $3\frac{7}{8}$ in. |
| Wing Span—Lower Plane | 43 ft. $0\frac{3}{8}$ in. |
| Depth of Wing Chord | 60 in. |
| Gap between Wings | 60 in. |
| Stagger | $9\frac{13}{16}$ in. |
| Length of Machine overall | 29 ft. 10 in. |
| Height of Machine overall | 10 ft. $10\frac{1}{2}$ in. |
| Angle of Incidence | 4 degrees |
| Dihedral Angle | 0 degrees |
| Sweepback | 0 degrees |
| Wing Curve | R. A. F. No. 6 |
| Horizontal Stabilizer-Angle of Incidence | 0 degrees |

AREAS:

| | |
|---|---|
| Wings—Upper | 242.65 sq. ft. |
| Wings—Lower | 198.48 sq. ft. |
| Ailerons (each 27.5 sq. ft.) | 55.00 sq. ft. |
| Horizontal Stabilizer | 28.70 sq. ft. |
| Vertical Stabilizer | 3.80 sq. ft. |
| Elevators (each 11.00 sq. ft.) | 22.00 sq. ft. |
| Rudder | 12.00 sq. ft. |
| Non-Skid Planes (each 3.10 sq. ft.) | 6.20 sq. ft. |
| Total Supporting Surface | 496.13 sq. ft. |
| Loading (weight carried per sq. ft. of Supporting Surface) | 4.86 lbs. |
| Loading (per B. H. P.) | 23.17 lbs. |

WEIGHTS:

| | |
|---|---|
| Net Weight—Machine Empty | 1900 lbs. |
| Gross Weight—Machine and Load | 2410 lbs. |
| Useful Load— | 510 lbs. |
| Fuel | 124 lbs. |
| Oil | 35 lbs. |
| Pilot | 165 lbs. |
| Passenger or other Load | 186 lbs. |
| Total | 510 lbs. |

## SPECIFICATIONS—CONTINUED

PERFORMANCE:

| | |
|---|---|
| Speed—Maximum—Horizontal Flight | 70 miles per hour |
| Speed—Minimum—Horizontal Flight | 45 miles per hour |
| Climbing Speed | 2,000 feet in 10 minutes |

MOTOR:

| | |
|---|---|
| Model OXX—8-Cylinder, Vee, Four-Stroke Cycle | Water cooled |
| Horse Power—(Rated) at 1400 R. P. M. | 100 |
| Weight per rated Horse Power | 4.01 lbs. |
| Bore and Stroke | $4\frac{1}{4}$ in. x 5 in. |
| Fuel Consumption per Hour | 10 gals. |
| Fuel Tank Capacity | 20 gals. |
| Oil Capacity Provided—Crankcase | 4 gals. |
| Fuel Consumption per Brake Horse Power per Hour | 0.60 lbs. |
| Oil Consumption per Brake Horse Power per Hour | 0.030 lbs. |

PROPELLER:

Material . . . . . Wood

Pitch—according to requirements of performance.

Diameter—according to requirements of performance.

Direction of Rotation (as viewed from pilot's seat) . . . . . Clockwise

DETAILS:

Dual Control.

| | |
|---|---|
| Pontoons—Length | 15 ft. 10 in. |
| Pontoons—Width | 4 ft. $\frac{1}{2}$ in. |
| Pontoons—Depth | 2 ft. |

Main pontoon supplied with step.

Wings supplied with pontoons at outer ends.

Standard Equipment—Tachometer, oil gauge, gasoline gauge, complete set of tools.

Other equipment on special order including hoisting cable.

# SPECIFICATIONS

## CURTISS MODEL F FLYING BOAT

GENERAL DIMENSIONS:

| | |
|---|---|
| Wing Span—Upper Plane | 45 ft. 2 in. |
| Wing Span—Lower Plane | 35 ft. 0 in. |
| Depth of Wing Chord | 62 in. |
| Gap between Wings | 71 in. |
| Stagger | 0 degrees |
| Length of Machine overall | 28 ft. 0 in. |
| Height of Machine overall | 9 ft. 8½ in. |
| Angle of Incidence | 6½ degrees |
| Dihedral Angle | 0 degrees |
| Sweepback | 0 degrees |
| Wing Curve | Curtiss |
| Horizontal Stabilizer-angle of Incidence | 1 degree |

AREAS:

| | |
|---|---|
| Wings—Upper | 218.6 sq. ft. |
| Wings—Lower | 158.00 sq. ft. |
| Ailerons (each 21.7 sq. ft.) | 43.4 sq. ft. |
| Horizontal Stabilizer | 26.8 sq. ft. |
| Vertical Stabilizer | 24.2 sq. ft. |
| Elevators (each 13.75 sq. ft.) | 27.50 sq. ft. |
| Rudder | 13.5 sq. ft. |
| Non-Skid Planes (each 8 sq. ft.) | 16 sq. ft. |
| Total Supporting Surface | 420 sq. ft. |
| Loading (weight carried per sq. ft. of Supporting Surface) | 5 lbs. |
| Loading (per B. H. P.) | 22.80 lbs. |

WEIGHTS:

| | |
|---|---|
| Net Weight—Machine Empty | 1440 lbs. |
| Gross Weight—Machine and Load | 2100 lbs. |
| Useful Load— | 660 lbs. |

| | |
|---|---|
| Fuel | 200 lbs. |
| Oil | 30 lbs. |
| Pilot | 165 lbs. |
| Passenger or other Load | 265 lbs. |
| Total | 660 lbs. |

## SPECIFICATIONS—Continued

**Performance:**

| | |
|---|---|
| Speed—Maximum—Horizontal Flight | 65 miles per hour |
| Speed—Minimum—Horizontal Flight | 45 miles per hour |
| Climbing Speed | 1,500 feet in 10 minutes |

**Motor:**

| | |
|---|---|
| Model OX—8-Cylinder, Vee, Four-Stroke Cycle | Water cooled |
| Horse Power—(Rated) at 1400 R. P. M. | 90 |
| Weight per rated Horse Power | 4.17 lbs. |
| Bore and Stroke | 4 in. x 5 in. |
| Fuel Consumption per Hour | 9 gals. |
| Fuel Tank Capacity | 34 gals. |
| Oil Capacity Provided—Crankcase | 4 gals. |
| Fuel Consumption per Brake Horse Power per Hour | 0.60 lbs. |
| Oil Consumption per Brake Horse Power per Hour | 0.030 lbs. |

**Propeller:**

Material . . . . . Wood

Pitch—according to requirements of performance.

Diameter—according to requirements of performance.

Direction of Rotation (as viewed from pilot's seat) . . . . . Clockwise

**Details:**

Dual Control—Abreast.

Horizontal Stabilizer—Triangular.

Balanced Rudder.

Non-Skid Planes between outer wing struts above top-plane.

Two Wing Pontoons.

| | |
|---|---|
| Hull—Nose to Rudder Post | 24 ft. 7 in. |
| Hull—Width | 4 ft. 7 in. |
| Hull—Height | 3 ft. 7 in. |

Standard Equipment—Tachometer, oil gauge, gasoline gauge, complete set of tools.

Other equipment on special order.

# CURTISS AERONAUTICAL MOTORS

CURTISS motors occupy a unique position in the world of Aviation. They were the first successful aeronautical engines to be placed on the market. They hold practically every Aviation Record both for speed and endurance. They are the only American motors representing years of practical and successful experience in the manufacture and daily use of aeroplanes.

It was the motor that he designed and built, even before he turned his attention to aviation, that made Glenn H. Curtiss famous.

The Curtiss Aeronautical Motor is the fruit of thirteen years of painstaking effort to produce a power plant combining high efficiency, power and reliability with low weight and low fuel consumption.

No other motors, of equal power, will stand for so long a time the strain of delivering *maximum* power under varying conditions. Time and again Curtiss motors have established new world's records for speed and endurance. With them Mr. Curtiss won such important trophies as—

The Gordon-Bennett International Trophy,
The Scientific-American Trophy
(won successively in 1908, 1909 and 1910),
The Collier Aviation Trophy,

and made all his well known pioneer flights, such as his trip down the Hudson River from Albany to New York City, and others of equal note. With them he was enabled to perfect his great inventions—the flying boat and hydroaeroplane.

With various improvements, which years of ripening experience have brought, Curtiss motors are now recognized throughout the world as thoroughly reliable and efficient aeronautical power plants. They have frequently been run continuously for a hundred hours, without being torn down or adjusted, and aviators who have seen them in action marvel at their steadiness and lasting qualities.

Early in the progress of aviation both the Army and Navy selected Curtiss motors and Curtiss aeroplanes and hydroaeroplanes as especially well suited for military service. Many foreign governments have since placed orders for great quantities and are using them in large numbers for training and service work. There is no more severe work to which an aeroplane or motor can be subjected.

Almost without exception the big things done in American Aviation, since the production of the Curtiss motor, may be attributed to its power, speed and reliability. Without it the big Flying Boats would have been impossible. Without it the Curtiss product would never have attained the widespread reputation that it enjoys to-day.

It drove J. B. R. Verplanck and Beckwith Havens to victory, in the Aero-Hydro 1,000 mile cruise from Chicago to Detroit. It carried the same machine safely through to Buffalo and later, down the Hudson River, from Albany to New York City.

It has carried Victor Carlstrom successfully through his many famous record flights; including those from Newport News, Va., to Washington, D. C., and from Chicago to New York.

In the early days when Frank Burnside attacked the Lincoln Beachey altitude record, attaining nearly 12,000 feet, the Curtiss "OX" motor helped him on.

William S. Lucky, winner of the "Aerial Derby" around Manhattan Island and Chas. Niles, second man to finish that then strenuous race, both used Curtiss motors.

In their flight, from Newport News, Va., to New York City, Steve MacGordon and William Thaw relied upon Curtiss motors.

Glenn L. Martin's record breaking flights in his Tractor-Aero-Yacht was made with this same reliable Curtiss power plant.

Harold F. McCormick's successful season of aero-commuting, between his summer home in Lake Forrest and his offices in Chicago, was made possible by Curtiss motor.

With it Ruth Law made her record breaking flight from Chicago to New York City.

Curtiss motors and aeroplanes have helped to make the reputations of such famous flyers as Victor Carlstrom, Lincoln Beachey, C. K. Hamilton, Lawrence Sperry, Lieut. T. G. Ellyson, Lieut. J. H. Tower, Charles C. Witmer, Beckwith Havens, Francis Wildman, John Lansing Callan, W. E. Doherty, David H. McCulloch, Hugh Robinson, Philip Rader, William Thaw, John McCurdy, Capt. Augustin Parla, Stephenson MacGordon, as well as a hundred or more famous exhibition flyers and amateur sportsmen.

# CURTISS DEVELOPMENT

In the nine years since the first aeroplane of the Aerial Experiment Association made a successful flight at Hammondsport, N. Y., the improvement in the Curtiss product has been so rapid that the step from the experimental machine to the highly perfected, practical Curtiss aeroplanes and hydroaeroplanes of to-day has been made in less time than similar progress has ever been recorded in the development of any other important means of transportation.

In 1908 Mr. Curtiss won the first aeroplane contest in this country, by flying what was then considered a remarkable distance of a mile and one-half straightaway. A year later he outclassed the dozen or more of the world's aeroplane makers who had by that time entered the field, by winning the first Gordon Bennett International Aeroplane Race, which was held at Rheims, France.

Always continuing to experiment, Mr. Curtiss, in 1910, in an aeroplane equipped with pontoons, the first step in the development of the Curtiss hydroaeroplane, made the first great cross-country aeroplane flight, from Albany to New York, a distance of 150 miles, in the actual flying time of 152 minutes.

Having demonstrated by his own achievements the practical value of the Curtiss aeroplane as a machine embodying durability, speed, safety, and an instinctive control, Mr. Curtiss turned his attention to the further development of the Curtiss aeroplane along two distinct lines—for military purposes and for pleasure.

At his experimental station at San Diego, California, during the winter of 1910 and 1911, Mr. Curtiss developed further improvements in the construction and design of his machines. It was, also, at San Diego that the first flight from land to water, and vice versa, was made, the new Curtiss hydroaeroplane being used for the purpose.

These various developments, resulting from the San Diego experiments, were witnessed by officers especially detailed from the United States Army and Navy. The military authorities at Washington, recognizing the exceptional advantages of the Curtiss aeroplane and the Curtiss hydroaeroplane for Army and Navy uses, immediately proceeded to equip the two branches of the service with these machines.

It is this finished product, developed and manufactured under the personal direction of Mr. Curtiss, who has preferred to profit by his own experience in actual flight rather than depend on the experience of others, that is now offered to those seeking a new and exciting sport and to those who recognize the commercial and practical values of the aeroplane.

# EARLY CURTISS RECORDS

The first aeroplane:

To make a previously announced flight in public, July 4, 1908, by Glenn H. Curtiss at Hammondsport, N. Y.

To win a prize in open competition in America, *Scientific American* trophy, July 4, 1908, by Glenn H. Curtiss at Hammondsport, N. Y.

To win the Gordon Bennett International trophy, August, 1909, by Glenn H. Curtiss at Rheims, France.

To make a city-to-city flight, May 29, 1910, Glenn H. Curtiss, Albany to New York.

To use a river as an aerial highway, May 29, 1910, Glenn H. Curtiss, Albany to New York down the Hudson.

To carry a message from one official to another, May 29, 1910, by Glenn H. Curtiss, Governor Hughes, Albany, to Mayor Gaynor, New York.

To successfully alight on the water, June, 1910, Glenn H. Curtiss on Lake Keuka, Hammondsport, N. Y.

To demonstrate bomb dropping possibilities, June, 1910, Glenn H. Curtiss, at Hammondsport, N. Y., auspices *New York World*.

To make an over-the-ocean flight, fifty miles, July, 1910, Glenn H. Curtiss, Atlantic City, N. J.

To demonstrate aerial sharpshooting with an army officer, Lieutenant T. E. Fickel, U. S. A., marksman, August, 1910, Sheepshead Bay, New York.

To send and receive wireless messages from an aeroplane in flight, August, 1910, by J. A. D. McCurdy, at Sheepshead Bay, New York, and in February, 1911, McCurdy at Palm Beach, Fla.

To alight on and fly from the deck of a battleship, January 18, 1911, Eugene Ely at San Francisco.

To fly from the water, January 26, 1911, Glenn H. Curtiss, on San Diego Bay, San Diego, Cal.

To alight alongside and be hoisted aboard a warship, Glenn H. Curtiss, February 17, 1911, at San Diego, Cal.

To fly from land to water and from water to land, Glenn H. Curtiss, February 23, 1911, San Diego, Cal.

To arise from the water with passenger, Glenn H. Curtiss with Lieutenant Theodore G. Ellyson, U. S. Navy, passenger, at San Diego, Cal., February 27, 1911.

To be adopted by the United States Navy as practical air and water craft, April, 1911.

To be equipped with dual control, allowing two aviators to operate the control while in flight.

To be used by Navy officers in over-water flight, Lieutenant T. G. Ellyson and Lieutenant J. H. Towers, Annapolis, Md., to Buckroe Beach, Va., 143 miles, October 25, 1911.

To be used in carrying U. S. mail in long over-water flight, Hugh Robinson down the Mississippi River, Minneapolis, Minn., to Rock Island, Ill., 375 miles.

To ascend to the height of 11,642 feet (world's record), Lincoln Beachey, at Chicago, August 20, 1911.

To win inter-city race in the United States, Lincoln Beachey, New York to Philadelphia, August 5, 1911.

To fly over Niagara Falls and through the Gorge, Lincoln Beachey, June 28, 1911.